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November 28, 1949

STEEL

The Magazine of Metalworking and Metalproducing

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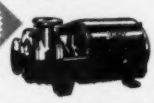

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Behind the Scenes...

Feel Better?

Regarless of what your own P & L statement may look like so far this year and even though you may have just had to borrow a couple of bucks from your secretary to see you through lunch, you should this week go about your duties with a big broad smile on your face and be tickled pink that things are so wonderful. This, dear friend, is National Prosperity Week and whether you are flat broke or not you're supposed to look, act and feel prosperous —or the Christmas Club people won't like it.

Great To Be Young

Last week our fellow Shrdlu, Mr. McKinney of Albany, N. Y., seemed at least mildly interested in how old we are and although it is one of those things that is pretty much taken care of by itself, we're willing to make an admission. We just celebrated our 8th birthday, and we don't mean this column. Last night our younger daughter threw a party at our house for sixteen of her eight-year old friends and Daddy was right in there pitching for all he was worth, which, as the little woman will tell you is a difficult thing to measure. All joking aside, if you haven't recently had the opportunity to revert back to the life of an eight-year old you don't know what fun you're missing. You will rediscover some of the finest things in life—sheer happiness, pure love, unadulterated friendliness, refreshing innocence, contagious excitement, and boundless joy. We will have to admit that after packing them all (and we do mean all) into the station wagon and delivering them one by one to their respective homes, we felt a lot tireder than any healthy eight-year old should. Also it was quite a shock to discover that the locusts had apparently not left a scrap of food in the Shrdlu domicile except what was ground into the carpet or stuffed behind the draperies, so after taking the broken chair and glasses down to the basement both Mommy and Daddy had what is referred to vulgarly as a quick snort and headed down to the local hamburger joint for a cheeseburger with the works. Ah, to be eight again!

Pension Guides Available

It looks like this problem of pensions is going to be with us for a long time to come and if you're one of the medium size or smaller companies don't think for a minute it isn't something that will catch up with you soon. So, just in case you missed Walter Campbell's special advice to smaller companies on **Puzzling Pension Problems** we suggest you let us know and we'll be glad to sent you a reprint of this concise two-page article which will give you some helpful hints on procedure.

Something New Brewing

We took a little stroll up to the ninth floor the other day to see what the editors were doing on the Yearbook issue, which is slated for January 2, 1950. Apparently our timing was all wet because we were practically thrown out of the editorial precincts. All we can say now is that they're doing plenty, but it's all under wraps for the present. "We've got something new", they say, and if you'll just be patient, we'll pry some of the details loose and pass them along to you in another week or so.

Puzzle Corner

Now that Thanksgiving is under our belts, literally and figuratively, we'll let you in on the answer to that puzzler about the trouble-maker whom the boss wanted to end up turkeyless. He cheated him out of a turkey by starting the counting with the third person to the left of him, and counting clockwise.

Now—are you ready to go slightly batty? Okey, tackle this: A perfectly flexible rope hangs over a frictionless pulley. A weight is tied to one end and at the other end hangs a monkey of equal weight. The rope weighs four ounces per foot. The combined ages of the monkey and its mother equal four years, and the weight of the monkey is as many pounds as the mother's age. The mother is twice as old as the monkey was when the mother was half as old as the monkey will be when the monkey is three times as old as its mother was when she was three times as old as the monkey was. The weight of the rope plus the weight is half as much again as the difference between the weight of the weight and the weight of the weight and the weight of the monkey. The question is: How long is the rope?

Shrdlu

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STEEL

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STEEL

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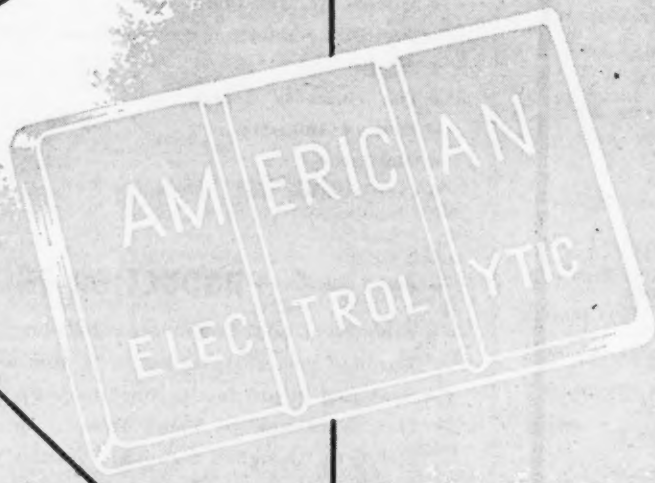

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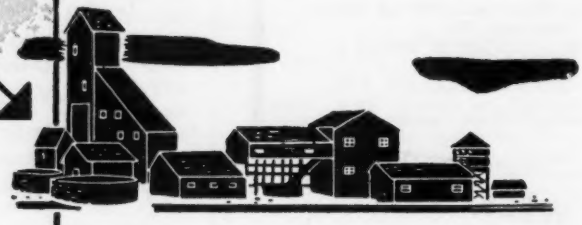

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November 28, 1949

Confusion on Pensions

Now that steel output rapidly is approaching prestrike levels, many interested persons will begin to analyze the pension plans which were adopted hastily in the atmosphere of strike excitement. The more these pacts are examined critically, the more will be the disappointment.

One of the principal reasons for this disappointment is the fact that none of these plans comes even close to solving the problem of pensions. In many instances the agreements which were reached under pressure merely provide for a stop-gap arrangement whereby certain employees who will become eligible for retirement during the next five years will be assured of pensions. The plans do not make any provision for the employees who will retire after the life of the present contracts.

This means that the companies are committed to a heavy financial burden for plans which will not prove satisfactory. It means that union leaders will be forced repeatedly to push for improvements, extensions and modifications of the plans to meet the desires of employees. Perhaps it is no exaggeration to say that the entire subject of pensions, from a standpoint of national policy, is in a state of unprecedented confusion.

This confusion accentuates the problems of small companies whose managements are being pressed by unions for pension plans similar to those adopted by the primary steel producers. The confusion also points to the need of a careful restudy of the government's social security program. Somewhere along the line there must be a halt in new commitments on pensions until competent authorities can digest what has been done and prescribe a sensible policy for the future development of pensions.

Senator Robert A. Taft seems to be the first public official to sense the overall danger in the present mess. Last Tuesday he declared that the subject of pensions in industry and government is in such complete confusion that it should receive the most careful study by Congress.

Certainly the situation calls for study and clarification which will lead to sound policy before it is too late. To attempt to erect a social security system on the foundation of the makeshift plans recently adopted would be disastrous. It would be far better to start over again on a sensible basis.

* * *

HOW CUT OBSOLESCENCE?: Arthur Keating, president of Ekco Products Co., Chicago, offers a suggestion for hastening the modernization of machinery and equipment in American plants. He believes that if the United States government would offer American metalworking companies two simple inducements, a large quantity of older machinery and equipment now in use could be transferred to underdeveloped countries and put to work. The inducements would be special depreciation allowances on exported equipment and government guarantees of rental income on leased equipment.

Mr. Keating believes this program would move large quantities of used machinery to under-developed countries and would help increase American private investment abroad to $2 billion by 1952. At the same time it would accelerate the purchase of modern machines and equipment by American manufacturers.

Machine tool builders find the idea interesting, but doubt if it is practical. They point out that experience shows that most foreign coun-

(OVER)

tries want the latest models available. Few will take used equipment even on lease or as a gift.

Many machinery authorities believe the simplest way to encourage the use of modern, efficient machines is to shorten the period over which the cost of a machine is depreciated. It is unrealistic for the government to ask machine tool users to spread depreciation over 20 years when the profitable life of a new machine seldom exceeds 10 years. —p. 32

* * *

DIESELS FIND MARKET: Experience shows that sometimes it takes a long time for even the best of products to find its profitable market. A case in point is the diesel engine.

Many readers of this page will remember how the future of the diesel engine was described in glowing terms 30 or more years ago. During the intervening period it made impressive progress in the marine field and for stationary installations, but it was not until the last four or five years that it gained widespread acceptance as motive power for American railroads.

During the first ten months of 1949 the railroads put into operation 1577 new locomotives, 1524 of which were diesels. The current overwhelming shift to this type of power makes one wonder why the roads waited until John Lewis practically forced them to abandon coal.—p. 29

* * *

SALVAGING MANGANESE: It is a coincidence that a story on how the Bureau of Mines is working on a plan for recovering manganese from steel plant slag appears at the same time that E. W. Davis, in Part II of his treatise on iron ore, discusses beneficiation—particularly of Mesabi ores.

Mesabi ores have an average manganese content of between 0.6 and 0.7 per cent. Much of this manganese is going into basic open-hearth slag appearing in the form of flush slag containing about 10.8 per cent manganese. Bureau of Mines is working on the idea of converting the flush slag in a blast furnace to spiegeleisen containing 30 per cent manganese and 4 per cent phosphorus, "selective oxidation" of the manganese from this molten phospho-spiegel to produce a synthetic ore containing 55 to 60 per cent manganese low in phosphorus and finally conversion of this synthetic ore in a second blast furnace to standard 80 per cent ferromanganese.

If this scheme works, it would yield 500,000 tons of ferromanganese annually. —pp. 34, 78

KEEN RIVALRY IN STEEL: Rivalry in steel is an important factor in the problem of effecting economic unity in Western Europe. Right now it looks as if output of steel ingots and castings by the rivals in 1949 will approximate 16,575,600 net tons for Great Britain, 7,839,600 tons for France, 6,844,400 tons for Belgium and Luxemburg, and 6,159,600 tons for Western Germany. In recent months Belux production has slipped sharply, so that at the year-end the race will find Britain leading by a big margin, France and Germany neck and neck and Belux fourth.

Political factors affecting the rivalry in steel will play an important role in 1950. Nationalization of Britain's steel industry, postponed by compromise, will be decided by general elections on Feb. 23 or Mar. 2. France and Germany will use every available political advantage to improve their respective rankings in steel. —p. 37

* * *

LITTLE THINGS COUNT: In describing the efficient lubrication service system employed by Thompson Products Inc., O. M. Albl, lubrication engineer, reveals how attention to little things pays off handsomely.

At Tapco plants, the names "oiling department" and "oilers" are not used. Instead there is a "lubrication department" and there are "lubrication service men." The change has attracted a higher type of personnel, permitting a raising of standards. Cabinets, supervisors' desks and other appointments of lubrication stations are kept clean and neat. Each man has a drawer at the main station for his personal tools, such as grease gun, oil cans, tallow pots, etc.

This individual assignment of tools has cut replacement costs considerably. One man has used the same oil can and grease gun for more than five years. When equipment was used by the personnel of all three shifts nobody was interested in keeping it in first class condition.

The pay-off on attention to these little things is that down time chargeable to the lubrication department is under 0.5 per cent of production hours over a seven-year period. —p. 66

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

BUSINESS OUTLOOK— Look for at least a short-term spurt in business activity. Steel production, at 80 per cent of capacity late last week, is recovering with surprising speed and will soon equal or surpass the prestrike level of 85 per cent (p. 27). One factor sustaining the economic pace is the construction industry whose volume in 1950 is expected to equal the record $19,250 million of 1949. Coal, of course, is the perennial enigma. If Mr. Lewis orders his miners out again Dec. 1, it will be for the thirteenth time since the war.

TRANSPORTATION— Even the transportation industry, in a mild slump this year, is doing some buying (p. 29). Pennsylvania Railroad has placed a $9.5 million contract with Baldwin Locomotive Works for 91 diesel-electric locomotive units. Southern Pacific will buy 3100 new freight cars and will overhaul 900 box cars. Canadian Pacific is ordering 58 diesel-electric locomotives, to cost $12 million.

NATIONAL TUBE EXPANSION— National Tube Co. has nearly completed a three-year expansion and modernization program at its Lorain, O., works (p. 30). Major units in the U. S. Steel Corp. subsidiary's program are a continuous seamless pipe mill, new blooming, bar and billet mills, a new bessemer steel plant, 177 new by-product coke ovens and a warehouse.

SHAVING— Get a close shave this morning? Both razor blade and electric shaver manufacturers are doing their part (p. 31). Razor blade sales, at about 3 billion blades a year, are double what they were in 1939, and the volume will increase in 1950. This comes despite the inroads made by electric razor manufacturers. An estimated 9 million electric shavers are now in use, compared with perhaps 5 million a decade ago. Manufacturers see a potential market for 25 million electrics ultimately.

USED MACHINERY— If you're looking for an economical way to replace old machinery with new, this idea (p. 32) circulating in metalworking circles will be of interest: If the U. S. will allow special depreciation allowances on exported equipment and government guarantees of rental income on leased equipment, American metalworking companies can transfer older machinery to less developed countries. This would be in line with President Truman's Point Four program. Machine tool builders' reaction is skeptical. They say the idea is "logical but impossible." Similar plans were tried unsuccessfully under UNRRA and ECA.

STEEL IN EUROPE— Steel is figuring prominently in Western European politics (p. 37). A production race is forming which will exceed that of the 1920s in intensity. This thwarts hopes for economic unity. France particularly is alarmed at Germany's increasing production. In Britain, the Labor government's agreement to defer steel nationalization until after elections is seen as a major conciliatory gesture toward the Conservatives.

AUTOMOBILES— Hudson is invading a lower-price field with the 6-cylinder Pacemaker model, but it's still costlier, larger and heavier than the Ford, Chevrolet or Plymouth (p. 41). List price is $1795 for the four-door sedan, about $250 under the present six in the super series . . . New 1950 Pontiacs and Mercurys were unveiled last week, but the changes are minor.

HERE AND THERE IN INDUSTRY— America's annual loss from smog exceeds $1.5 billion (p. 38) . . . Business is bright for steel wool makers because use of the product has increased 54 per cent in a decade (p. 38) . . . The Bureau of Mines has a research project in progress to devise means to recover manganese now wasted in steel plant slag dumps (p. 34) . . . The rural area has become one of the electrical product industry's most important markets now that 78.2 per cent of the nation's farms receive central station electric service (p. 32) . . . Carnegie-Illinois Steel Corp. has completed a new telegraph center at its Chicago offices (p. 32) . . . The index of new orders and shipments of machine tools fell to 56.8 in October from 57.7 the previous month (p. 33).

Engineering News, p. 55 *Market Summary, p. 101*

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Steel Output Recovers Rapidly

Although steel consumers will need several weeks before inventories are balanced again, tonnage is coming from the mills in surprising volume

FLOW of poststrike steel to consumers is in river-like proportions, not in a trickle as originally anticipated.

Although it will still take several weeks for many steel users to balance their inventories again, steelmen are surprised at the speed of the recovery. One factor contributing to the recovery has been fast repair work.

Ingot Rate Soars—Just two weeks after the bulk of the steel industry had made its truce with the steelworkers, the ingot capacity rate was at 80 per cent of capacity for the week ended Nov. 25, a rise of 24 points from the 56 per cent reported the week before. Prior to the strike the rate was 85, a level which should be reached or surpassed this week.

Steel mill operations in the Pittsburgh district are at about prestrike levels now. With most of the basic producers in the area committed on pension and insurance agreements, furnaces will turn out steel during this week at about an 85 per cent clip.

Hasty Conversion? — Steel users who signed up for conversion steel because they thought there would be a shortage are now wondering if they acted in haste. If there is any shortage, it will probably be in the Midwest, but even midwestern users will have a relatively easy time obtaining sheets from eastern mills. The only premium will be the extra freight cost. Consumers, incidentally, are likely to oppose bitterly any widespread price boosts.

Indicative of the general supply situation is Studebaker Corp.'s position. It will have to close for only seven days beginning Dec. 1 because of lack of steel. Studebaker, like many other consumers, began stockpiling for itself and suppliers as far back as last May. Despite the steel strike and the company's lost production, it expects to produce 300,000 cars and trucks for the year, an alltime high.

Shadow of Coal—The enigma in coal shadows all business prospects. Since the war John L. Lewis' United Mine Workers have gone on strike 12 times. Three of the walkouts have been ended by government intervention or injunctions. President Truman says he will use injunction provisions of the Taft-Hartley act if an emergency develops when and if the thirteenth occurs. For temporarily defying the two government injunctions to date, Mr. Lewis and the UMW were fined a total of $2,130,000.

Building Pace To Hold

Construction in 1950 will equal the 1949 record of $19,250 million, says Commerce Department

LOOK for the total value of new construction to be put in place in 1950 to equal the 1949 record of $19,250 million.

This is the performance expected by the U. S. Commerce Department's Office of Domestic Commerce and the U. S. Labor Department's Bureau of Labor Statistics.

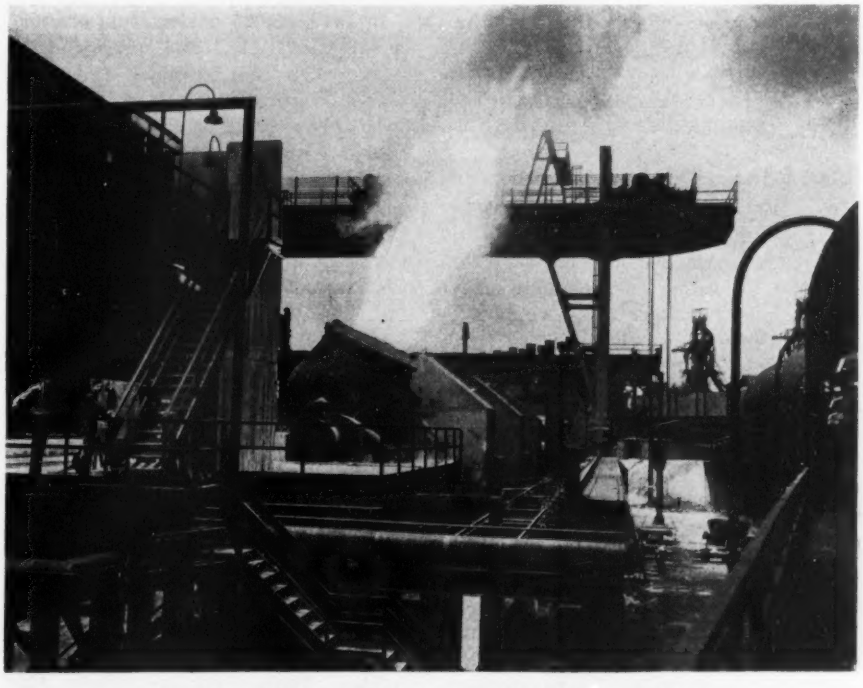
Private construction outlays probably will drop about $925 million from the 1949 total but indications are that public expenditures for new construction will increase by a like amount, leaving the overall total for 1950 about the same as that for 1949. Private construction in 1950 would total $13,100 million; public construction, $6,150 million.

More Commercial Buildings—Nearly all segments of private construction will be down or at least no greater than in 1949. The only exceptions are expected to be: 1. Commercial buildings, which may increase slightly as a result of pressure for shopping facilities to serve new residential areas; and 2. gas utility construction. New nonfarm dwelling units to be started in 1950 probably will decline to 900,000, compared with nearly a million in 1949, for indications are that the higher-priced market is nearly saturated and that building costs will not decline substantially, the joint report of the two bureaus says.

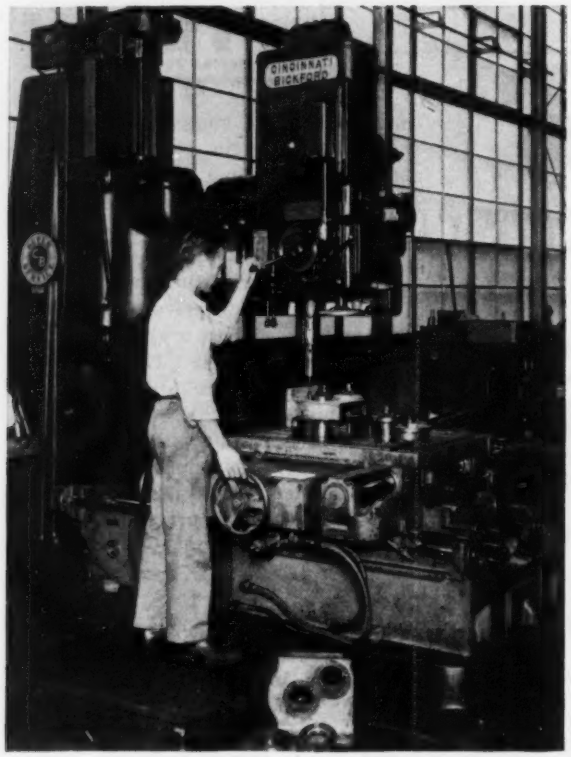
Industrial Building Down — Construction of new industrial plants and facilities next year is expected to drop about 26 per cent, from $975 million to $725 million, continuing the downtrend that has been so marked during 1949 as immediate postwar expansion plans were completed.

In public construction every category except military and naval facilities probably will be larger next year.

Construction costs, the bureaus be-



STEEL AGAIN FLOWS TO CONSUMING PLANTS
. . . as output recovers to 80 per cent of capacity



LOOK! NO JIGS: Jig precision on repetitive work—without use of jigs—is accomplished on this machine embodying units by two companies. Precision drilling machine by Cincinnati Bickford combined with Man-Au-Trol spacing table by Bullard results in coordinated assembly by which pre-determined patterns of holes can be repeated exactly. In this case three different parts are drilled and tapped at one setup. Twenty holes are involved. Savings can be made on as few as five pieces

lieve, will be relatively stable in 1950 at about the level in the latter half of 1949. Thus, with the total dollar volume expected to be unchanged, the physical volume represented in 1950 is expected to be about the same as that in 1949.

Power Shovel Outlook Good

Improved demand for commercial-size power shovels and cranes is anticipated next year, says C. B. Smythe, president of Thew Shovel Co., Lorain, O.

He believes dollar sales for the whole industry this year will be off 40 per cent from the 1948 peak. Net sales of Thew for this year will be about $20 million.

Gas Range Shipments Soar

Manufacturers' shipments of gas ranges reached an alltime high in October when 260,000 units were shipped, according to preliminary reports received by Gas Appliance Manufacturers Association.

The previous highest monthly shipments were in May, 1948, when 257,800 units were shipped, and October, 1948, with 257,500 gas ranges.

Vacuum Cleaner Sales High

October was a good month for vacuum cleaner sales. Vacuum Cleaner Manufacturers' Association reports factory sales of standard-size household units for the month were second highest of any month in 1949 and came within 3.2 per cent of the total for October, 1948. The October total was 272,520 vacuum cleaners, compared with 250,036 in September and 281,573 in October, 1948.

Sales for the first ten months of 1949 aggregate 2,367,762 units, 16.2 per cent below the corresponding 1948 total of 2,827,842. In all of 1941, the best prewar year, 1,670,129 units were sold.

More Refrigerator Dealers

Almost a thousand more dealers sold electric household refrigerators in 1949 than in 1948.

In 1949, 88,025 dealers sold electric refrigerators; in 1948, 87,066 sold them, says the National Electrical Manufacturers Association. The figures are a result of a second survey completed by NEMA's Statistical Department.

They represent all the dealers for the 12 companies included in the survey: Admiral Corp., Avco Mfg. Corp., Coolerator Co., Frigidaire Division of General Motors, General Electric Co., Gibson Refrigerator Co., Hotpoint Inc., International Harvester Co., Nash-Kelvinator Corp., Norge Division of Borg-Warner Corp., Seeger Refrigerator Co. and Westinghouse Electric Corp.

Aircraft Orders Awaited

The aircraft industry expects the Air Force to make public new contracts out of 1950 appropriations.

They were pared to about $1.4 billion by President Truman from $2 billion. There may be nearly $200 million more temporarily withheld, but there will still be $1.2 billion or more available for additional plane purchases. The Navy's program of $400 million to $600 million is in addition to this amount.

Washington reports indicate that Republic Aviation Corp. may get an order for its F-84E, a tactical jet fighter. Lockheed Aircraft Corp. is slated for orders for variations of its basic F-80 fighter and its new F-94 all-weather jet fighter. Other manufacturers to get contracts will be North American Aviation Inc., Boeing Airplane Co. and Douglas Aircraft Co.

Gross National Product Off

The gross national product was at an annual rate of $256 billion in the third quarter of 1949, says the U. S. Office of Business Economics.

This estimate of the market value of the nation's output of goods and services is about $3.5 billion below the corresponding rate for the second quarter and $7 billion below that for the first quarter.

Despite the decline in value of total production from the second quarter rate, the business situation during the third quarter was essentially stable. Total domestic demand for purposes other than inventory investment remained firm, and monthly figures indicate that declining trends evidenced earlier this year in important segments of the economy were arrested or reversed in August and September.

Personal consumption expenditures, at an annual rate of $178.5 billion, were within $500 million of the second-quarter figure. Acquisitions of durable goods, led by automobiles, television sets and household appliances, exceeded those of the second quarter by $2 billion, at annual rates, and consumer expenditures for services rose slightly. Consumption of nondurable goods fell by nearly $3 billion.

Business purchases of fixed assets held firm.

Increased liquidation of business inventories in the third quarter represented a major element of decline in gross national product. The value of the reduction in stocks was $2.5 billion, at an annual rate, as compared with $1.5 billion in second quarter.

Makes Ductile Iron Castings

YOUNGSTOWN Foundry & Machine Co., Youngstown, is producing ductile iron castings in sizes up to 12 tons, for the steel industry under International Nickel license, reports B. G. Parker, president. Laboratory tests indicate that a blast furnace slag ladle, just shipped, will not crack or warp in service.

Railroads Place Orders

Two carriers buy $21.5 million worth of diesel-electric locomotives. One getting new cars

PURCHASE of new rolling stock by railroads has slowed up but it hasn't been stopped in its tracks.

Pennsylvania Railroad has given Baldwin Locomotive Works a $9.5 million order for 91 diesel-electric locomotive units, Southern Pacific will acquire 3100 new freight cars and give 900 box cars a general overhauling, and Canadian Pacific Railway has ordered 58 diesel-electric locomotives at a cost of $12 million.

Pennsylvania's order includes twenty-four 750-hp switchers, forty-one 1000-hp switchers, four 1000-hp road switching engines, three 2000-hp switchers, each comprised of two 1000-hp units equipped for multiple operation, and sixteen 1500-hp road freight units.

Part of Expansion Program — Southern Pacific's plans are the latest steps in its program to expand freight-carrying facilities. The new freight cars will consist of 300 steel box cars and 100 drop-end gondola cars. The latter will be 65 feet long to accommodate extra long loads. Of the 3000 box cars 1000 will be automobile cars, of which half will be fitted with the latest type autoloading racks.

A substantial number of the new cars, says A. T. Mercier, Southern Pacific president, may be built in the company's own shops, where the overhauling program on the 900 cars will be carried out at an average rate of 90 cars a month during 1950.

Since the war Southern Pacific has ordered 20,530 freight cars of various types. By the end of this year all except 1000 of them will have been delivered. Delivery of them will be completed by the end of next March.

Replacing Steam Locomotives — Canadian Pacific's order is the largest ever placed by a Canadian railway for this type of equipment. Montreal Locomotive Works, a subsidiary of American Locomotive Co., will build 44 of the units and the new plant of General Motors Diesel Ltd. at London, Ont., will produce the other 14. The diesels, which will replace 68 steam locomotives now destined for service elsewhere on the CPR system, are to be used in freight service on the 517-mile Schreiber division between Ft. William, Ont., and Cartier, Ont. CPR is making this heavy investment with the expectation that substantial economies will result from dieselization.

Montreal Locomotive Works will start making deliveries on this order early in 1950, and GM will turn out its units between July and September, 1950.

Lauds Coal Turbine's Future

The coal-burning gas turbine locomotive is the most serious competitor yet offered to the diesel, says Dr. John Rettaliata, engineering dean at Illinois Institute of Technology, Chicago.

Fuel savings of 50 per cent can be expected from the 4000-hp engine being built by Allis-Chalmers Mfg. Co. and to be tested in about a month, Dr. Rettaliata reported to the Chicage Wholesale Shippers Association. Lubrication costs on the engine, he says, should not exceed one-tenth of those on a comparable diesel, and, he adds, the turbine's purely rotary motion reduces maintenance costs.

The coal-burning gas turbine has been found to be very reliable, many of them having been employed in oil refineries continuously several years without a shutdown, Dr. Rettaliata points out.

Some other attractive features of the new engine: It doesn't require water for operation. And it doesn't smoke.

Machinery Orders to Baldwin

Not only has Baldwin Locomotive Works added a multimillion-dollar order from Pennsylvania Railroad to its books but it has sold a large high-production type bending roll and a plate planer for the new pipe mill Consolidated Western Steel Corp., a United States Steel Corp. subsidiary, will set up at Orange, Tex. (see p. 30).

Baldwin also has received orders for a number of hydraulic presses for manufacture of dry ice and molded plastics, and eight testing machines of various types ranging from 4000 to 400,000 lb capacity.

Bus Demand Takes a Holiday

Bus demand has taken a holiday.

So, ACF-Brill Motors Co., Philadelphia, is operating its bus building facilities at only 15 per cent of capacity, the company having put a large segment of equipment and space on a standby basis and reduced employment rolls.

Indicative of the drop in demand, only 125 busses are on the company's order books, compared with a peak of 2600 in April, 1947. Many municipal and private transportation firms are in dire need of equipment but find financing it an almost insurmountable problem.

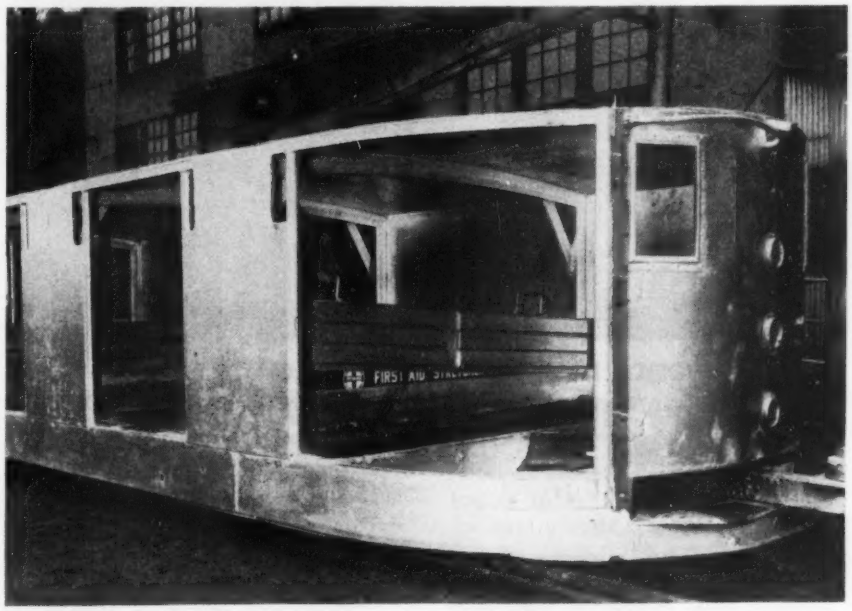
Locomotive Business Good

Installation of 1577 new locomotives by American railroads in the first ten months of 1949 is the greatest in 26 years, says the Association of American Railroads.

Comprising the installations were 1524 diesels and 53 steam locomotives.

On order Nov. 1 were 812 diesels, 17 steam and four electric engines.

The association's report shows 77,618 new freight cars were put into service between January and October and that 17,419 additional cars were on order Nov. 1.



POTENTIAL AMBULANCE: Mantrip cars used for Jones & Laughlin Steel Corp.'s mines in western Pennsylvania are equipped with special first aid outfits. One door of the car is large enough to admit a stretcher. First aid outfit was developed by Mines Safety Appliance Co., Pittsburgh

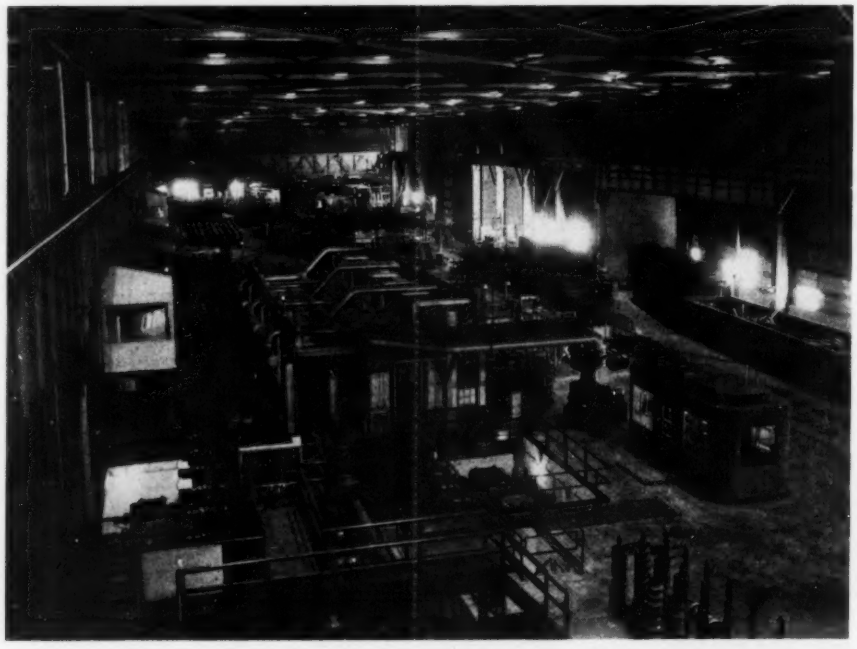
National Tube Finishing Huge Project

Program started three years ago modernizes and expands Lorain, O., works all the way from equipment to handle incoming raw materials to shipping department

AN EXPANSION and modernizing program so vast it has required three years is nearing completion at National Tube Co.'s works at Lorain, O.

The improvement program reached from one end of the plant to the other—from handling of raw materials to shipment of finished products—and is of key importance in the billion dollar coast-to-coast postwar improvement and development program of United States Steel Corp., of which National Tube is a subsidiary.

New Continuous Mill—Major units in the improvement program at Lorain are the world's first continuous seamless pipe mill, new blooming, bar, and billet mills, an entirely new bessemer steel plant, 177 new by-product coke ovens, and a modern warehouse for pipe storage under roof. It is literally a pipe dream come true.



WORLD'S FIRST CONTINUOUS SEAMLESS PIPE MILL
. . . National Tube Co.'s pipe dream come true

The new steelmaking facilities boost National Tube's rated output at Lorain to about 2,250,000 tons annually.

The continuous mill, developed by National Tube engineers, eliminates several steps in the conventional method of making seamless pipe. The continuous rolling process has long been identified with hot-rolled strip and sheet mills, and is being employed for the first time at Lorain to turn out long lengths of seamless steel pipe. The new mill is designed to make small size seamless pipe products ranging from 2 to 4.5 in. in diameter. The mill's rated capacity is 18,000 tons of pipe a month.

To Supply Other Plants — Steel rounds for seamless pipe production at Lorain, billets and slabs for the plant's buttweld pipe mills, and additional billets for other plants of U. S. Steel will be produced in the new blooming, bar, and billet mills. This unit includes four major mills —one blooming, one bar, and two continuous billet mills. Twenty-four modern, bottom-fired soaking pits have been installed to reheat for rolling the ingots from the bessemer and open-hearth shops.

The new bessemer steel plant has three active 25-ton converters, and for spare use a fourth converter. They employ a new deoxidation process developed by National Tube engineers: It makes possible seamless production with bessemer steel.

Concentrates Buttweld Output — Another facet of the program of revamping is the concentration at Lorain of all of National Tube's buttweld pipe production. This led to installation of new galvanizing facilities for buttweld.

Reaching down into the raw materials end of the works, National Tube made major improvements at its ore docks on the Black river, where the largest vessels engaged in ore shipping on the Great Lakes can be unloaded. Two new Hulett ore unloaders have replaced two smaller unloaders, and the entire dock was rebuilt.

Doubles Coke Production—Coal and coke handling facilities have been enlarged and modernized, numerous changes have been made in facilities for recovery of coal chemicals, and a coal and coke laboratory have been provided. Coke production at Lorain has been doubled with installation of three new batteries of by-product coke ovens. Each battery has 59 ovens. Along with four older batteries of 52 ovens each, these facilities can produce 1,650,000 tons of coke annually.

Going beyond the productive equipment of the plant, National Tube devoted considerable attention and expense to its shipping facilities. It built a quarter-mile-long warehouse for stocking and shipping of pipe sizes 4 in. and less. Storage capacity is 40,000 tons with facilities for handling several hundred different standard pipe items. Assembly line setup of the warehouse is designed to speed shipment of customers' orders.

Texas Pipe Mill Site Changed

ACQUISITION of a government-owned building at Orange, Tex., has influenced Consolidated Western Steel Corp. to change its plans and locate its new tube mill at Orange rather than at Houston.

Consolidated Western, U. S. Steel Corp. subsidiary, offered last May to buy the government surplus facilities located on Consolidated Western's land at Orange, but the U. S. attorney general ruled that such disposition would tend to create a situation inconsistent with the antitrust laws. Consolidated Western withdrew its offer of purchase and in October announced it would locate its new pipe mill on property it owns in Houston.

Before adjourning this fall, Congress adopted a joint resolution directing the government's General Services Administration to consummate on behalf of the government the sale of the facilities at Orange to Consolidated Western. President Truman approved this resolution Oct. 28 and the sale followed.

The Orange facilities were a wartime shipyard and are adjacent to Consolidated Western's existing structural fabricating plant.

Closer Shaves: Both Blade and Electric Razor Sales Soar

Twice as many razor blades will be used this year as in 1939 despite electric shavers

THE FIVE O'CLOCK shadow is disappearing.

Or at least it should be for twice as many razor blades are sold today as in 1939; this despite the inroads made by electric shavers. The accompanying chart shows that 3 billion blades will probably be sold this year, compared with 1.5 billion a decade ago. Producers attribute the increase to the larger population, higher incomes which permit men to shave more frequently and the influence of army service when thousands of men had to shave regularly for the first time in their lives.

50 Million Shavers—An estimated 50 million men are using 60 blades a year. Sales this year are running 10 to 20 per cent above what they were last year. In 1950 the volume should be about 15 per cent above 1949. Sales this year will probably approximate $85 million, compared with $45 million in 1939.

Twenty-four companies contributed to the production before the war, but only ten are active now. Among them are Gillette Safety Razor Co., Marlin Firearms Co., Pal Blade Co. Inc., American Safety Razor Corp.

Foreign Sales Poor — American blade makers find themselves bottled up on foreign sales because of currency difficulties. Gillette is probably in the best position because it has eight foreign plants. The United States, Germany and Great Britain were the major exporters before the war. Today Britain is in the lead. Thirty-three British firms export an average of 1,125,000 blades a day.

Production costs this year are slightly higher than last, and 100 per cent higher than in 1939. Research and development work is largely devoted to cost cutting. This year some companies are spending as much as 80 per cent more than in 1948 to develop the specialty machinery needed in manufacturing. Funds allocated for research in the industry now exceed the 1939 appropriations by about 200 per cent.

MANUFACTURERS of electric shavers generally make all of their parts except the plastic components. Sunbeam's new Shavemaster has a nylon drive shaft connecting the motor with the shaving blade. Being hollow, it can act as a reservoir for lubricant for the two bearings.

Razor Steel Sources Shift

A revolutionary shift has quietly occurred in the razor blade industry because in ten years American manufacturers have changed from foreign to domestic steel supplies.

Prior to the war nearly all razor blade steel came from Sweden. Even though Sweden would like to recapture this market, very little is imported from her now because domestic producers can supply all needs, which run to over 8500 tons a year. American razor blade steel prices are competitive with the Swedish and have risen only moderately since the war. This factor has kept razor blade price rises small despite the sharply increased cost of labor.

Until the late 1930s domestic razor steel production was negligible. Razor blade companies made provisions just before the war to assure domestic supplies if the Swedish failed. American steelmen, who hitherto had not bothered with the small-tonnage business, agreed to see what they could do. The result has been that American interests are hanging on to a small but profitable specialty steel market which is growing with the razor blade industry. The steel used is a high carbon alloy made to unusually strict metallurgical specifications from only the best grades of pig iron and scrap.

About 9 million electric shavers are in use. Potential market seen for 25 million

FACE the facts. Electric shavers are here to stay. Some 9 million of them are in use today, compared with an estimated 5 million in 1939.

Manufacturers predict that 25 million men, half of all adult males, will be dry shavers ultimately. Sales now are two to two and a half times what they were in 1939, about on a par with the record 1948 and will probably exceed the 1948 level next year. Sunbeam Corp., Chicago, one of the largest makers, still must allocate its production. Other major manufacturers include Remington Rand Inc., New York, and Schick Inc., Stamford, Conn.

Business Is Seasonal—The industry's business is seasonal; perhaps 70 per cent of the sales volume is concentrated in November and December. A survey of 5000 buyers reveals that 54 per cent were switching from blade shaving and 46 per cent were already using electrics.

The industry has advanced rapidly since the first electric shaver was introduced—by Schick—in 1932. Sunbeam's 1937 model, for example, produced 7 million cutting actions per minute; its next model had 13 million; the 1949 model has 28 million. The increase has come principally through use of a progressively larger head. Sunbeam's 1937 price tag was $15. Prices now are $22-$24.

PUSH-BUTTON PRIVATE TELEGRAPH SYSTEM
. . . U. S. Steel's answer to 12,000 incoming calls

Saves 300 Man-Hours per Day in Message Center

TELEGRAMS between United States Steel Corp. subsidiaries can now be flashed by just the push of a button.

A new telegraph center, the most modern in the world, was completed during the strike at Carnegie-Illinois Steel Corp.'s offices in Chicago. It is getting its first real workout now that mills are again producing steel.

The push-button system, replacing the old cord-and-plug type, is designed for speed and ease in switching the nearly 12,000 incoming messages received each day by the corporation's Chicago station for destination points all over the nation.

Representing a 21,000-mile network leased from Western Union Telegraph Co., the center ranks Chicago as one of the largest telegraph switching centers for U. S. Steel. It was developed by Western Union engineers.

Steel or Hotel Accommodations—Like many other large corporations, U. S. Steel has a private wire telegraph system carrying messages as diversified as an order for hundreds of tons of steel or a request for hotel accommodations. There are ten major switching centers and about 138 stations in 86 towns and cities to provide efficient communication between plants and offices of the corporation's subsidiaries. Any station in the network can transmit telegrams to any other by pushing a button and without any other manual handling of the messages at any point. Each message is typed only once on the typewriter-like keyboard of a teleprinter at the originating point, and flashed to the center. There a clerk, seeing the destination on the tape, touches the proper button. An electric brain connects the message with a circuit to its destination. Operators don't have to continually plug in and out.

Cord-and-plug operators who handled about 235 messages an hour may switch about 400 an hour. They save about 300 man-hours each day.

Big Rural Electric Market

WITH 4,582,016 or 78.2 per cent of the nation's farms receiving central station electric service today, the rural area has become one of the electrical industry's most important markets. So says M. E. Henning, executive vice president and general manager of Penn Electric Switch Co., Goshen, Ind., who spoke before the annual meeting of the National Electrical Manufacturers Association, Nov. 14-18 in Atlantic City, N. J.

44 Per Cent of Population — The market embraces 2590 of the country's 3072 counties and represents 44 per cent of America's population. Farm cash income this year is expected to total about $28 billion. Farm debts and mortgages are at the lowest point in history and savings are at an alltime high.

Recent surveys, Mr. Henning says, indicate that rural customers will buy 3 per cent more electrical appliances than city residents, whereas nonfarm rural residents will buy 10 per cent more of the same products than in the case of average city families.

Potential business for the electrical manufacturing industry in the rural market over the next five years may be this: $2 billion for electric appliances, $675 million for electrical farm production equipment, $865 million for generating equipment, distribution transformers, protective devices and similar apparatus and $300 million for wiring and wiring devices.

Machinery for Point 4

Transfer of used American equipment to underdeveloped countries proposed

CAN used American mass production machinery be sold or leased to underdeveloped countries under the Point 4 program? Does this proposal suggest a way for metalworking companies to replace their older equipment with machinery of latest design? Would it bolster the domestic market for heavy equipment? Would it enable the metalworking industries to raise their productive level for either peace or war?

These are some of the questions being tossed back and forth among metalworking executives on the proposal that used machinery be treated like used cars and passed along to less affluent neighbors. There is no agreement on the answers.

The Proposal — If the United States government would offer American metalworking companies two simple inducements, a large quantity of older machinery and equipment now in use could be transferred to the less developed countries and put to work, says Arthur Keating, president of Ekco Products Co., Chicago, housewares manufacturer.

These inducements are special depreciation allowances on exported equipment and government guarantees of rental income on leased equipment.

Mr. Keating believes such steps would move large quantities of used machinery to the depressed areas and would help increase American private investment abroad from last year's $850 million to $2 billion by 1952.

Such shipments abroad, he believes, would encourage American companies to accelerate their purchases of more efficient new equipment and thus bolster the heavy equipment industries and generally raise the productive level of American industry.

Want Tomorrow's Tools—Fly in the ointment, say machine tool builders, is that the foreign countries are mighty pernickety about the kind of

machinery they will accept. They don't want yesterday's designs, they want tomorrow's. And it doesn't matter much if the equipment is offered for free, at 10 cents on the dollar or at other generous concessions.

David Ayr, new president of the National Machine Tool Builders' Association and of the Hendey Machine Co., Torrington, Conn., and Tell Berna, general manager of the NMTBA, point to this country's experience in trying to sell, lease or give used machinery to foreign countries since the war. It didn't succeed under UNRRA. It didn't succeed under ECA. They doubt that it can be worked under the Point 4 program.

Objectives Approved—"Logical, but impossible," is the summation one machine tool man gives the proposal. Machinery men generally approve the objectives, but they think it just won't work.

Much of the machinery men's doubt arises from the government's attitude in dealing with the beneficiary countries. Uncle Sam isn't hard-boiled enough. He doesn't follow through on foreign-aid programs. He doesn't back up his nationals investing in foreign countries.

British Policy Tougher—American machinery builders don't like the way British and other foreign builders are invading the foreign market. They don't like the thought that they are paying, through the Marshall Plan and other foreign aid, for the rehabilitation of the machinery industries of British and continental countries, which in turn are becoming serious competitors.

Britain, they say, is doing more for its industry than is the United States —in encouraging sales abroad and offering better depreciation inducements for the replacement of older, more obsolete machinery. In some cases, Britain allows 40 per cent of the cost of new machinery to be depreciated in the first year.

Need Accelerated Depreciation — The United States, says Lloyd D. McDonald, past president of the National Machine Tool Builders Association and vice president of Warner & Swasey Co., Cleveland, in most cases insists on depreciation over at least a 20-year period:

"The facts show in our industry that on the average, owing to our rate of improvement, a machine tool model is rendered obsolete within about seven years after introduction. I doubt whether most companies in doing replacement arithmetic reckon the anticipated profitable life of a new machine at more than ten years.

"As matters stand today, it is impossible for a company to gain out of depreciation allowances the funds sufficient for replacement."

Big Tool Exhibit Planned

British machines, machine tools and scientific instruments will occupy more than 35,000 sq ft of floor space at the Canadian International Trade Fair, May 29 to June 9, 1950. This exhibit will spearhead the British drive for Canadian markets and bears out the warning given to the American Society of Tool Engineers by a leading Canadian industrialist (STEEL, Nov. 7, p. 86).

Some adjustments between established British production methods and Canadian inspection practices have already been made and others will be made, report British industrialists, so that U. K. machines can be integrated into the overall operation of Canadian plants.

October Tool Orders Down

Total new orders and shipments of machine tools in October declined from September's levels; foreign orders advanced fractionally.

The National Machine Tool Builders' Association's indexes for October as compared with September are: Total new orders down to 56.8 from 57.7, shipments down to 62.3 from 67.6 and foreign orders up to 13.8 from 13.7. Because of the decline in shipments the ratio of unfilled orders to shipments rose to 3.8 to 1 in October from 3.7 to 1 in September.

The decline in domestic ordering was largely the result of the steel strike as metalworking firms faced with the prospect of shutdowns were reluctant to buy capital equipment.

Association's indexes are based on average monthly shipments in 1945—1947 equaling 100. Average annual shipments in the base period were $355 million.

Elected by Machine Tool Builders

FREDERICK S. BLACKALL JR.
President and treasurer, Taft-Peirce Mfg. Co., Woonsocket, R. I., named second vice president

JEROME A. RATERMAN
President, Monarch Machine Tool Co., Sidney, O., becomes association's treasurer

RICHARD E. LeBLOND
President, R. K. LeBlond Machine Tool Co., Cincinnati, elected first vice president of NMTBA

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Recovery of manganese wasted in steel plant slag would be permitted by process studied by Bureau of Mines. Project is aimed at keeping industry going if manganese is cut off

RESEARCH PROJECT under way in the Bureau of Mines is aimed at keeping the steel industry going if foreign manganese sources are cut off in event of another war.

The project would permit recovery of manganese now wasted in steel plant slag dumps. It is being carried on in co-operation with the steel industry and with financial assistance from the American Iron and Steel Institute. Here's why: Mesabi, nonbessemer iron ore, which will continue to be the backbone of steel production for years to come, has an average manganese content between 0.6 and 0.7 per cent. Right now a large part of this manganese is going into basic open hearth slag, appearing in the form of "runoff," or flush slag containing an average of 10.8 per cent manganese and "final" or tap slag averaging about 6 per cent. It is the flush slag that is involved in the study.

Three Steps—Salvage of manganese from runoff slag would be in three steps:

1. The conversion of flush slag in a blast furnace to high-phosphorus spiegeleisen containing about 30 per cent manganese and 4 per cent phosphorus; 2. "selective oxidation" of the manganese from this molten phospho-spiegel to produce a synthetic ore containing from 55 to 60 per cent manganese low in phosphorus; 3. conversion of this synthetic ore in a second blast furnace to 80 per cent ferromanganese.

"Not Conclusive but Encouraging" —The first and third steps are known to be technically feasible. The second step presents the major problem. Research is being carried out at the Pittsburgh Experiment Station of the Bureau of Mines where experimental equipment is being installed. Preliminary tests already made are described by conservative Bureau spokesmen as "not conclusive, but encouraging."

The runoff slag under investigation is that produced by steel companies using lake ores. The companies represent about 73 million tons of the country's 94,233,460 tons of ingot capacity. At full production, companies using lake ore buy—or make from high grade manganese ore—635,000 tons of 80 per cent ferromanganese. They produce about 4.1 million net tons of flush slag annually, containing 10.8 per cent manganese, or 446,000 tons of manganese. The Bureau of Mines hopes 400,000 tons of manganese—equivalent to 500,000 tons of 80 per cent ferromanganese—can be recovered as standard alloy by the proposed process. This would make companies 79 per cent self-sufficient in manganese if they use lake ore. Instead of buying 635,000 tons of ferro, or producing it from purchased ore, they would have to buy or produce only 135,000 tons.

Success Would Reduce Requirements — Deducting 500,000 tons of ferro reclaimed from runoff slag, from the 820,000 tons required to produce ingots at capacity of 94 million tons, only 320,000 tons of ferro would have to be purchased or produced. Since 1.9 tons of 48 per cent manganese ore now is consumed in production of one ton of 80 per cent ferro, the success of this process would reduce our requirements of manganese ore from 1.6 million to 650,000 net tons annually.

Where would we get this remaining 650,000 tons of ore if a war should cut off foreign sources? The Bureau of Mines is studying how much manganese we have at home and how it can be used. Projects are in program in the Aroostook, Me., Artillery Peak, Ariz., Batesville, Ark., and Butte, Mont., districts, and in Alabama.

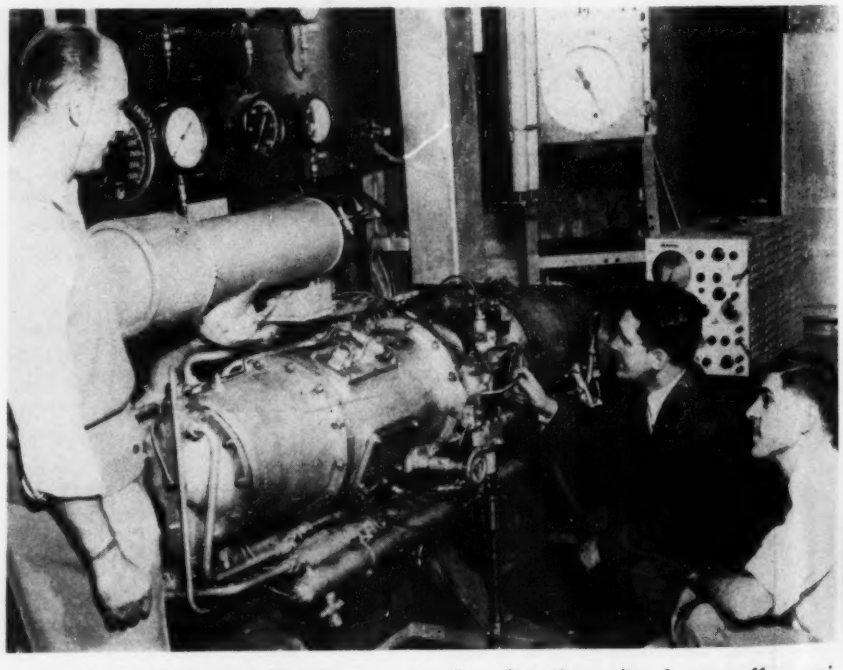
Other possibilities are scheduled for future study: Ways and means of salvaging manganese from basic open hearth tap slag, bessemer vessel cinder, electric furnace slags, and flue dust and slag produced by blast furnaces operating on ferromanganese.

Pending development of its process, the Bureau of Mines is urging steel companies to segregate basic open-hearth flush slags from other steel plant wastes for possible future recovery of manganese. This practice has already been adopted at three major steel plants, operating 90 of the country's 954 open hearths.

British Team Reports Findings

BRITISH TEAM which early last summer visited the United States under ECA sponsorship to study technological "know-how" reports: Simplification of products to eliminate special sizes and styles for which there is little demand has been an important factor in stepping up man-hour productivity in U. S. industry.

The team was especially impressed with the simplifications worked out by the valve and fittings, grinding wheel, bolt, nut and rivet, heavy ma-



"FREE PISTON" DIESEL: The German-developed Junkers diesel may offer engineering answers to the problem of developing a turbine engine for automobiles and trucks. This model at Stanford University's laboratory is an air compressor, but can be designed as a power gas generator for a turbine. NEA photo

NO PLACE FOR REPLACEMENTS HERE!

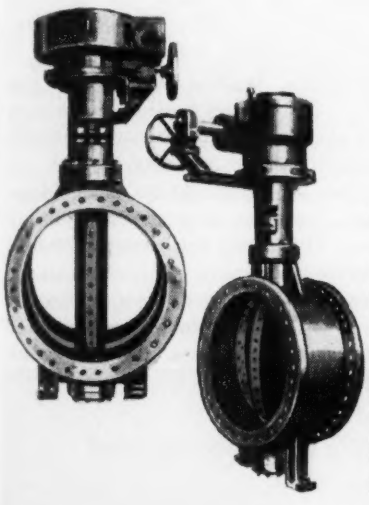
. . . so the nation's biggest underwater tunnel uses Everdur† Electrical Conduit to carry traffic light and control cables. New York's Triborough Bridge and Tunnel Authority, builders of the Brooklyn-Battery Tunnel, made selection on the basis of long-time service records on comparable installations.

WELL, WELL, WELL, WELL

That's right, four of 'em. 38" diameter slotted well screens of Everdur, built by the Layne-Northern Company of Mishawaka for Elkhart, Indiana's water supply. Reasons: strength, weldability, machinability, corrosion resistance . . . and nary a trace of rust!

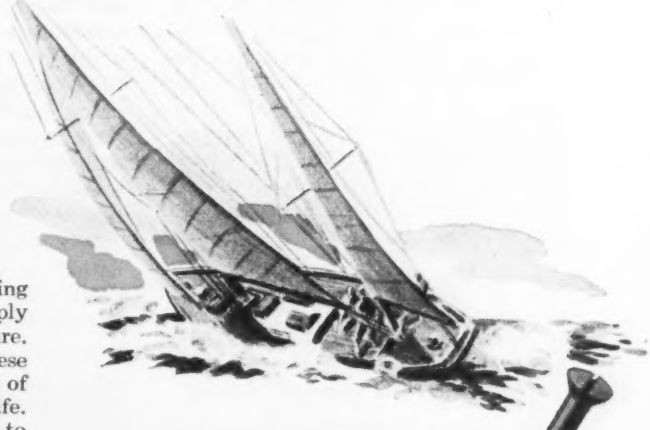
Watching EVERDUR* At Work

†REG. U. S. PAT. OFF.



TRAFFIC CONTROLS

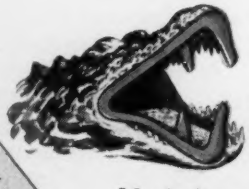
Down from the Alvarado Regulating Reservoir rushes the water supply for San Diego at 100-lb. pressure. Many of the vital parts of these mechanical traffic cops are made of Everdur for long operating life. These big butterfly valves, up to 42" I. D., were made by Coldwell-Wilcox Division of Krajewski-Pesant, New York.



HAPPY THOUGHT IN A SQUALL!

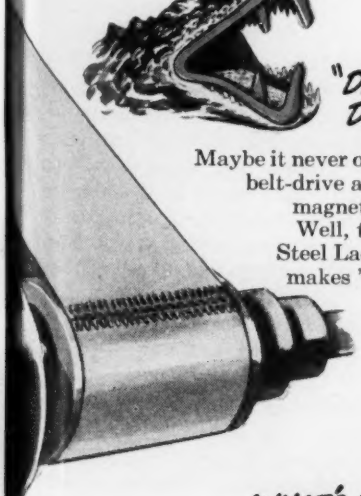
When thunderheads race up and your boat lays over on her beam's end — you pray everything will hang together. That's the time to be thankful for your boat builder's judgment in using strong, tough, non-rust Everdur fastenings

. . . and speaking of seagoing metals, the Design Engineering Company of South Pasadena, California, developed this marine shell block of Everdur. Maximum strength and minimum weight are combined in this one-piece, folded-and-drawn, rivetless block construction. 49190



"DID YOU KNOW" DEPARTMENT

Maybe it never occurred to you that many belt-drive applications require a non-magnetic, spark-resistant lacing. Well, they do. And the Flexible Steel Lacing Company of Chicago makes 'em under the trade name "Alligator." Out of Everdur, of course.



P.S. HOW ABOUT SENDING IN YOUR STORY ON EVERDUR?

WHAT'S YOUR METAL PROBLEM?

Maybe Everdur can help. Our Technical Department is always ready to serve. Just write to The American Brass Company, Waterbury 88, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

Where corrosion resistance counts

ANACONDA

COPPER-SILICON ALLOYS*

chinery and steel industries. It has recommended a simplification campaign for every British industry that lends itself to such an effort.

Two Lending Agencies?

SHOULD the government maintain two business lending institutions instead of the one it does now?

The question is before the Douglas subcommittee on Monetary, Credit and Fiscal Policies, Joint Committee on the Economic Report. The proposal was initiated by Thomas B. McCabe, chairman, Federal Reserve System board of governors. It would empower Federal Reserve banks to make loans, for, say, ten years' maturity, to small business when loans are not available from private sources. Reconstruction Finance Corp. has this power now.

Private banks should be encouraged to take care of financial needs of small business, and in normal times they fulfill this function, says Mr. McCabe. But, the usual sources of short-term credit, he says, may not be adequate in times of financial depression or in such abnormal times as during the defense and war periods. Small business in normal times frequently requires—for purposes of plant modernization and the purchase of machinery and equipment—longer-term funds than private banks are willing to supply through loans. The 12 Federal Reserve banks, says Mr. McCabe, should be authorized to take care of such requirements in the national interest.

He can see no inconsistency in permitting Reserve banks and RFC to operate alongside each other in giving financial assistance to business enterprises. RFC Chairman Haley Hise disagrees. He says flatly, "One source of federal assistance in a particular loan field appears sufficient in the interest of consistent policies and procedure."

Military Procurement Rules

SECTIONS 8, 13 and 14 of the manual on Armed Services Procurement Regulation are approaching the final drafting stages. They should be ready early next year to make the 15-section manual complete.

Section 8, on Termination of Contracts, is about ready for submission to an industry advisory committee for comment and criticism. Section 13, on Property Provided by the Government for Use by Contractors, is in preliminary form and will be submitted to the industry committee after it has been reviewed by the military committee. Section 14, on Inspection and Acceptance, is nearing the final drafting stage.

Principal feature of the new Section 8 is incorporation of restrictions on the discretion of contracting officers and prime contractors. It was added because of bitter criticism by the comptroller general of the manner in which certain contract settlements were handled after World War II. Prime contractors will not be permitted, as in the past, to settle conclusively the claims of subcontractors. Certain administrative safeguards have been inserted to protect the interests of the government in interim financing after termination.

This section provides for a contract clause for termination of contract at the convenience of the government. It spells out a formula whereby compensation is to be largely along the lines of the common law principle of damages. There is an exception: That the right to anticipatory profits—for work not performed—is subject to negotiation. It provides that termination claims must be filed within one year to prevent a repetition of long-drawn out settlement procedure due to dilatory contractors after World War II. It also provides that in cost-type contracts negotiation may be limited to the fixed fee; that contractors who desire to voucher out all their costs after termination rather than negotiate them must give notice within 30 days of the effective date of termination. Provision is made for appeals by contractors to the Armed Services Board of Contract Appeals.

Section 13 states the general policy of the armed services that contracts will be awarded to contractors who have or will furnish the necessary materials and tooling and facilities, and that such property will be furnished to contractors only when "necessary or desirable."

Section 14 at the start will be only a brief statement of general inspection and acceptance policies which can be applied uniformly by the three military departments. It is to be amended at some later date, as a result of a current study, to include more detailed procedures which are necessary on many items of procurement.

Get RFC Loans

LOANS of interest to the metalworking industry by Reconstruction Finance Corp. in September were:

Harvey-Whipple Inc., Springfield, Mass., manufacturer of oil-fired heating units, $500,000, for 4 months, for working capital.

Clyde Porcelain Steel Corp., Clyde, O., porcelain jobbing manufacturer, $510,000, for 5 years, for purchase of equipment, working capital and debt payment.

Columbia Machinery & Engineering Corp., Hamilton, O., manufacturer of metalworking, woodworking and earth-moving equipment, $500,000, for 4 months, for working capital.

Trailmobile Co., Cincinnati, manufacturer of truck trailers, bodies and accessories, $10,000,000 (with bank participation), for 5 years, for working capital and debt payment.

Texmass Petroleum Co., Dallas, Texas, oil and gas production, $15,100,000, for 10 years, for working capital, debt payment, oil property purchases.

Argus Inc., Ann Arbor, Mich., manufacturer of cameras and photographic equipment, $900,000, for 5 years, for debt payment.

Michigan Chemical Corp., St. Louis, Mich., chemical manufacturers, $1,100,000, for 10 years, for purchase of machinery and equipment, working capital and debt payment.

Aviation Maintenance Corp., Van Nuys, Calif., modification, conversion and overhauling of aircraft, $500,000, for 4 years, for working capital.

Ryan Aeronautical Co., San Diego, Calif., airplane and parts manufacturer, $1,000,000, for 5 years, for debt payment.

Central Iron & Steel Co., Harrisburg, Pa., steel plate producer, $1,650,000, for 5 years, for plant construction.

Tariff Cuts Contemplated

CONTEMPLATED tariff cuts to encourage imports from Europe will not be made next year without giving the industries involved an adequate opportunity to express their views.

The State Department's Tariff Agreements Committee is studying the appointment of numerous industry advisory committees and commodity groups and expects to call them into conferences in Washington in January. Decision to confer with industry representatives stems from the many letters which have been sent to the department by manufacturers and business men who fear the effect of lowered tariffs on their industries.

The proposed reductions in import duties are to be discussed with principal countries at a conference to be held in September, 1950, at a site still to be selected. New reciprocal trade agreements are to be negotiated at that time to become effective in 1951.

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Steel Mixes in West Europe's Politics

Intense production race, an obstacle to unity, is shaping up. France worried about Ruhr output gains. Britain defers steel nationalization

STEEL is the stumbling block in Western European politics.

Shaping up is a steel production race that will rival that of the 1920s in intensity. It is one of the most difficult obstacles in the way of Europe's economic unity. These estimated figures in net tons for output of steel ingots and castings show the positions of the contestants.

	1949		1948
	Sept.	Oct.	Mo. Av
Great Britain ..	1,484,600	1,489,500	1,381,300
France	719,000	800,000	653,300
Western Germany	836,000	762,800	513,300
Belgium. Luxemburg ...	500,000	492,000	578,700

France and Germany are neck and neck, a factor causing uneasiness in Paris and contributing to the French reluctance to go along with Britain and the United States in granting more freedom to Western Germany.

Belgium-Luxemburg is slipping in production and now has reverted to its prewar place as the fourth largest Western European producer. The Belux shrinking economy is influencing political unrest in an area which had one of the most stable postwar governments on the continent.

Nationalization Postponed — The British Labor government has compromised with the Conservative opposition and will postpone steel nationalization until after the next general election, which must be held before next July 1.

German steel shareholders are organizing to forestall any moves by the Bonn government toward nationalization of Ruhr steel. The conservative groups which won a plurality need support of parties favoring mild socialization: Hence, the nationalization tinge in the present government.

German producers are energetic participants in the steel race and are among the loudest protestants against overproduction in Europe. They claim that the French expansion is particularly unjustified (See STEEL, Nov. 21, p. 63).

French Steel Exports Gain

France is retaining only a precarious hold on second place among Western European steel producers, but she has moved into definite control of third place among the world's leading steel exporters.

Latest export figures, for September, show that she has surpassed Great Britain and is behind the U. S. and Belux. French shipments abroad in the month totaled 175,000 tons. This is three times the monthly average for 1943 and 46,000 tons above the 1933 average. Of the September total, 136,000 tons went to foreign countries and the rest to French overseas territories.

Exports may increase even more in the next few months. French prices are competitive with British and Belgian, but are higher than German. The Allies limit Ruhr exports to 900,000 tons yearly.

U. K. Vote To Decide on Steel

The next British general elections may be either on Feb. 23 or Mar. 2; they will decide whether the U. K. industry is to be publicly owned.

In a major compromise with the opposition, Labor agrees not to put the steel nationalization act into operation until autumn of next year—or well after the elections. The Conservatives will void the act if they win. If there is a Labor victory, Prime Minister Atlee says it will be a people's "mandate."

Devaluation proved only a temporary stimulus to Britain's lagging coal export business. Polish and German prices have readjusted to meet the U. K. threat, and now the competitive situation is about the same as last summer—fierce, with German and Polish producers having the edge because of lower costs. British coal men say that a further price reduction today is impossible. The only way is to cut costs by greater productivity. Production now per manshift is 2520 pounds; hope is that it will be 3360 pounds by 1965.

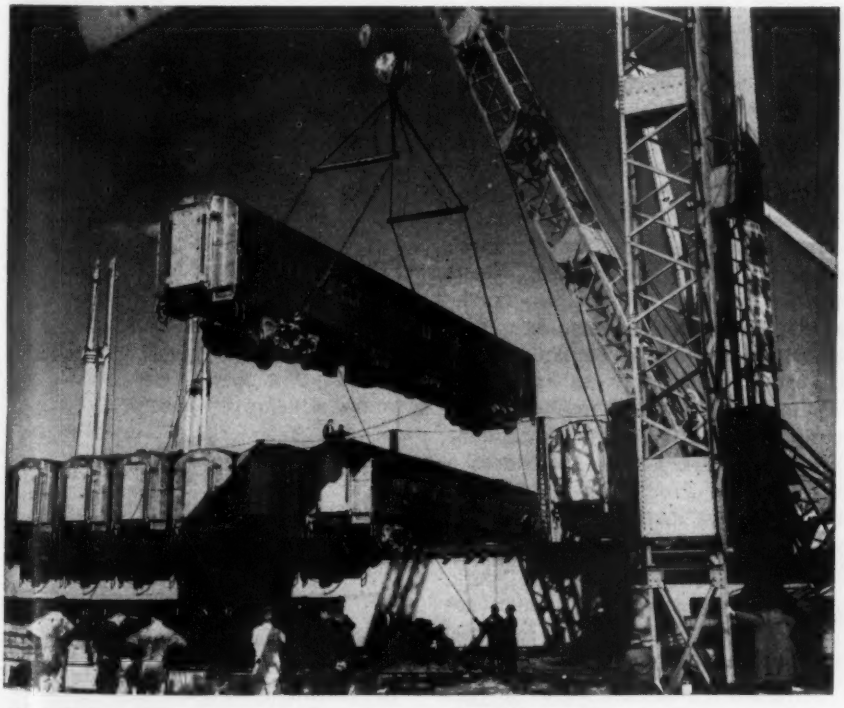
In 1937, Britain exported 3.7 million net tons of coal a month. Last March it exported 1,140,000 tons.

Ruhr Ownership Issue Rises

The German Shareholders Protective Association has been formed in Dusseldorf and is putting pressure on the Bonn government to abandon even hints of steel nationalization. The group also wants the government to do more to encourage capital investment in the industry. Government and banking representatives are in the U. S. now to drum up funds. Wall Street groups have shown interest, provided guarantees are given that there will be no nationalization.

The fiscal reform earlier and devaluation in September have put the German steel industry on a better financial footing. Stockholders are beginning to take notice again, even though dividend payments have been almost nonexistent since the war.

Prospects for all German metal-



STAINLESS STEEL SHIPMENT: Last of 24 all-stainless steel railroad cars for the Central Railway of Brazil is lifted aboard the *S. S. Christian Smith* in Philadelphia. Included in the shipment are sleepers, baggage-mail cars, coaches and kitchen-diners. They were made by Budd Co., Philadelphia. NEA photo

working industries except shipbuilding are at least fair. Inability of the three allied high commissioners to agree on allowing German shipyards to build for foreign orders is crippling the industry, says Theodor Schecker, president of the German Shipyards Association. He declares the industry could compete with the British if the Allies permitted it to take jobs. The shipbuilders are just barely keeping their heads above water with repair work.

Belgian Iron Goes to U. S.

The Belgian pig iron industry spurted slightly in October because of orders from American foundries which couldn't get supplies from the strike-bound U. S. furnaces. Luxemburg, Holland and Austria also got some contracts. Even with freight costs, European prices are competitive with American.

New Australian Steel Mill?

H. A. Brassert & Co., New York, is making a survey for a possible steel plant in Western Australia. Iron ore and limestone are available in the state, as is satisfactory metallurgical coke. Previously the limited coke supplies were the drawback, but technological advances have been made in the field since the war.

Australia is still suffering from an acute steel shortage, particularly in wire and structural shapes. Before the war its small domestic production (averaging about 1.9 million tons annually) was supplemented by imports from Britain, France and Japan. Japanese shipments are resuming only now. Domestic production since the war has fallen to 1.3 million tons because of strikes and ore and coal shortages.

Indian Industries To Expand

Tata Locomotive & Engineering Co. Ltd., Jamshedpur, has turned to the Indian government and Imperial Bank of India for a $5.8 million loan to finance its expansion program.

The company hopes to produce 100 locomotives and 100 spare boilers a year. This would make Telco one of India's two major locomotive builders. The other is a government plant in Bengal.

The government of India may also loan $15 million to the Indian Iron & Steel Co. and the Associated Steel Corp. of Bengal to finance expansion of coke and steel production facilities.

Indian Iron & Steel's project calls for construction of ovens to increase output of coke to about 780,000 tons annually. The Bengal project would increase its total steel production from 200,000 to 620,000 tons each year.

$1.5 Billion Lost in Smog

This annual loss estimated by Stanford University experts at air pollution meeting

AMERICA'S annual loss from smog exceeds $1.5 billion. That is the estimate of Stanford University research experts at the National Air Pollution Symposium in Pasadena, Calif.

Scientists and economists who participated in the symposium point out that the cost arises in damage to buildings and plants, equipment and fabrics, excessive laundry and cleaning bills, as well as depreciation of property values in polluted areas.

Cost of $100 Million Yearly—Government and industry expenditures to control smog now total about $100 million annually. Much of this is recovered in valuable materials derived from waste gases: Bromine, chlorine, sulphur dioxide and hydrogen chloride. It is estimated that 80 to 95 per cent of air pollution can be eliminated at reasonable cost.

Not so optimistic about the outlook is G. Edward Pendray, of Pendray & Leibert, New York, who spoke before the Industrial Hygiene Foundation in Pittsburgh. He says industry may now be spending $300 million or more annually to control air and water pollution. Yet the job of bringing the nation's air and water to even modest standards of purity may cost billions.

Companies Spend $35 Million—He says a sampling survey of 50 industrial organizations reveals that these 50 alone spent more than $35 million in the last two years to control air and water contamination. The 50 are planning additional expenditures of at least $32.5 million in the next two years.

Mr. Pendray suggests that business associations, together with major industrial and utility companies, might well conduct a national study of the problem to develop the outline of a national program.

Although industrial hygiene experts have made progress in controlling air pollution in factories and plant areas, a number of problems must still be solved by research, says Frank A. Patty, head of the industrial hygiene department, General Motors Research Laboratories.

Mr. Patty outlines some of these problems in an article, "Air Contamination Standards," for *Standards World*.

In tackling air contamination both inside and outside industrial plants, hygienists and toxicologists are confronted with:

1. Insufficient data on physiologic-

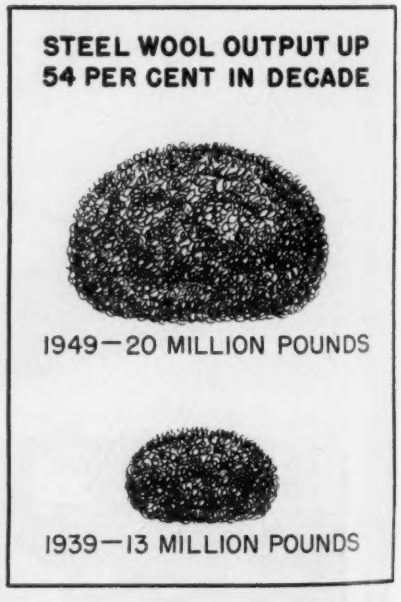
Business Bright for Steel Wool Manufacturers

KITCHEN pans should be brighter and industrial products smoother than a decade ago because the use of steel wool has increased 54 per cent in that time.

The accompanying chart shows that 20 million pounds of steel wool will be used this year for industrial and household consumption, compared with 13 million pounds in 1939. About 70 per cent of this output is for household use and 30 per cent for industrial. The seven companies making steel wool today do an annual volume of about $14 million, compared with a $7 million volume done by the six companies in business a decade ago. Production in 1950 will be 15 per cent more than in 1949.

Major industrial uses for steel wool are in all forms of abrasive work, particularly for products which get painted. New adaptations for steel wool are for filtering purposes.

Production costs are higher in 1949 than in 1948 because the price of wire, the base for steel wool, advanced 20 per cent. Wire quotations have risen 100 per cent since 1939, but steel wool prices have jumped only 50 per cent in the decade. In cutting or shaving steel wool from wire, the chip or fiber is the finished product. What remains in the machine becomes waste material, amounting to about 20 per cent of the steel consumed.



al effects continued exposure to contaminants has on humans.

2. Lack of standards for permissible concentrations of air contamination—concentrations actually safe for humans.

3. Fear that unnecessarily severe and impractical limits will be set for controlling air contaminants.

4. Conflicting viewpoints of experts on the subject because much about pollution is still unknown.

State Gets Air Detectives

Pennsylvania has launched an intensive program to study the problem of polluted air.

A special division of the Bureau of Industrial Hygiene, Department of Health, has been established to concentrate on the matter. Principal means of attack in the campaign will be a mobile field laboratory now being built for the bureau by Mine Safety Appliances Co., Pittsburgh. To be ready in two months, the laboratory will be equipped with scientific instruments and devices to sample and analyze atmosphere suspected of containing harmful gases or dusts. One instrument in the field laboratory will be Mine Safety's electrostatic dust and fume sampler.

Air pollution surveys will be made by the "air detectives" with the mobile laboratory at the request of industrialists, civic groups and public officials.

Welding Research Heads Named

H. C. BOARDMAN, research director, Chicago Bridge & Iron Co., Chicago, was elected chairman of the Welding Research Council at its annual meeting in New York. Dr. C. A. Adams, Philadelphia, who has been serving as chairman of the council since its beginning, is named honorary chairman and Dr. A. B. Kinzel, president, Union Carbide & Carbon Research Labs Inc., New York, is vice chairman of the council.

The Welding Research Council was created at the request of the American Welding Society and the American Institute of Electrical Engineers to foster and stimulate co-operative research in the welding field. It also makes readily available in condensed usable form the welding literature of the world. W. Spraragen continues to serve as director with offices at 29 W. 39th St., New York.

Ten $1000 Scholarships

TEN $1000 scholarships in American colleges and technical schools will be awarded each year to qualified students interested in engineering and administration in the fabricated structural steel industry.

The first ten scholarships will be given in 1950. They were authorized by the American Institute of Steel Construction when the organization adopted a comprehensive educational program. Scholarships will be awarded on a competitive basis.

Schools where the awards will be made have not yet been selected. Some will be those that offer combined work-and-study courses. Individual structural steel companies will give additional scholarships on the same basis, working through the institute. Several firms already sponsor their own educational plans.

Paul Coddington of Milwaukee, chairman of the institute's educational committee, says support of American education by industry for the protection of free enterprise is a strong motive underlying the institute's plan. A model educational foundation plan is being set up adaptable to any industrial company. Through it a percentage of profit can be set aside to finance educational projects.

Electroplating Wastes Studied

TO EVALUATE known methods of treating plating room wastes and to develop new methods of treatment are the objects of a research project sponsored by the American Electroplaters' Society.

Efficiency of treatment and its cost are being given the greatest consideration in the work carried on by Yale University under direction of Prof. B. F. Dodge. Assisting him are these men from industry: Henry B. Smith of R. Wallace & Sons Mfg. Co., Wallingford, Conn.; M. A. Orr of International Silver Co., Meriden, Conn.; Frank J. Holt of Sodium Products Division of E. I. DuPont de Nemours & Co. Inc., Wilmington, Del.; and Dr. C. F. Gurnham, Hamden, Conn.

Information obtained from the research will enable engineers to design equipment for specific installations and to keep its cost at a minimum. It is conceivable, says the society, that some plating concerns will find it unnecessary to treat all rinse waters but will treat only the wastes resulting from batch dumping of solutions. Cost of equipment would be materially reduced.

Since no satisfactory method was available for accurately determining very small amounts of cyanide in plating room wastes, the development of a method was a must. A procedure has been worked out. It will enable plating plants to determine the degree of toxicity of rinse waters.

CALENDAR OF MEETINGS

Nov. 27-Dec. 2, American Society of Mechanical Engineers: 70th annual meeting, Statler Hotel, New York. Society headquarters are at 29 W. 39th St., New York.

Nov. 28-Dec. 3, 22nd Exposition of Chemical Industries: Grand Central Palace, New York.

Nov. 30-Dec. 2, Society for Experimental Stress Analysis: Annual meeting, Hotel New Yorker, New York. Society postal address is Box 168, Cambridge 39, Mass.

Dec. 1-2, Council of Profit Sharing Industries: Second annual conference, Hotel Roosevelt, New York. Council headquarters are in the First National Tower, Akron.

Dec. 1-2, American Management Association: Conference on corporation finance problems, Waldorf - Astoria Hotel, New York. Association headquarters are at 330 W. 42nd St., New York.

Dec. 2, American Council of Commercial Laboratories: Meeting, Hotel Statler, Washington. Council headquarters are at 318 Evans Bldg., Washington.

Dec. 6, Material Handling Institute: Annual meeting, Hotel Commodore, New York. Institute headquarters are in the Clark Bldg., Pittsburgh.

Dec. 7-9, National Association of Manufacturers: Congress of American industry, Waldorf-Astoria Hotel, New York. Association headquarters are at 14 W. 49th St., New York.

Dec. 8-10, American Institute of Mining & Metallurgical Engineers: Seventh annual conference of Electric Furnace Steel Committee. Institute headquarters are at 29 W. 39th St., New York.

Dec. 9, Malleable Founders' Society: Western sectional meeting, Drake Hotel, Chicago. Society headquarters are at 1800 Union Commerce Bldg., Cleveland.

Dec. 12-15, National Warm Air Heating & Air Conditioning Association: Meeting, Hotel Cleveland, Cleveland. Association headquarters are in the Society for Savings Bldg., Cleveland.

Dec. 21-22, National Electrical Manufacturers Association: Fourth annual national farm electrification conference, Stevens Hotel, Chicago. Association headquarters are at 155 E. 44th St., New York.

Dec. 26-31, American Association for the Advancement of Science: Meeting, New York. Association headquarters are at 1515 Massachusetts Ave., Washington.

Jan. 10-11, American Home Laundry Manufacturers' Association: Fourth national home laundry conference, in Chicago.

Jan. 10-12, Conference on Industrial and Safety Problems of Nuclear Technology: Sponsored by New York University and Atomic Energy Commission, at New York University, Washington Sq., New York.

Jan. 10-12, Society of the Plastics Industry: Reinforced plastics division meeting and fifth annual technical session, Hotel Cleveland, Cleveland. Society headquarters are at 295 Madison Ave., New York.

Jan. 16-19, Plant Maintenance Show: Sponsored by American Society of Mechanical Engineers and Society for the Advancement of Management, at the Public Auditorium, Cleveland. Mechanical Engineers' headquarters are at 29 W. 39th St., New York.

Jan. 18-20, American Society of Civil Engineers: Annual meeting, Hotel Commodore, New York. Society headquarters are at 33 W. 39th St., New York.

Jan. 22-24, Institute of Scrap Iron & Steel Inc.: Annual convention, Hotel Statler, Washington. Institute headquarters are in the Dupont Circle Bldg., Washington.

Jan. 30-Feb. 1, American Material Handling Society, Chicago Chapter: Midwest material handling conference, in conjunction with Illinois Institute of Technology, in Chicago.

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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Hudson invades lower-price field with 6-cylinder Pacemaker model, still larger and heavier than Big Three cars . . . Pontiac, Mercury take wraps off 1950 series. Changes are minor

DETROIT

"INVASION of a lower-priced field" and the "completion of a task engineers set for themselves four years ago" is how Hudson describes introduction of a new Pacemaker 6-cylinder model, carrying list prices from $1675 for a three-passenger coupe to $1795 for a four-door sedan, averaging approximately $250 under the present six in the Super series.

While wheelbase is 5 inches shorter and overall length pulled in by 6 inches, there has been no sacrifice in the generous 64-inch seat widths, low center of gravity, "step down" principle of body construction or the 60-inch overall height pioneered by the company with its 1949 models. Shorter wheelbase (119 inches) and length (201½ inches) have permitted a weight reduction of about 200 pounds.

Better Forward View—One important feature is a much-improved view forward, as a result of a shorter hood and moving the passenger compartment ahead slightly. This has put a little squeeze on the engine compartment, although it still accommodates a 112-horsepower six with 232 cubic inch displacement without too much crowding. Bore is 3 9/16 inches, stroke 3⅞ inches, compression ratio 6.7 to 1, or 7.2 to 1 with a high-compression aluminum head. The engine is said to be completely new, not a modified version of the present six offered in Super and Commodore series. Performance and economy are aided through use of a dual jet, triple range, downdraft carburetor and a thermostatically controlled carburetor heater which utilizes exhaust gases to heat fuel passing through the intake manifold.

Semiautomatic Transmission — A modification of Hudson's semiautomatic Drivemaster transmission is offered under the name Supermatic drive. It is a two-range unit, which can be shifted over to conventional drive by manipulating a dash button, and in high range provides what is described as a high cruising overdrive gear, not a conventional overdrive as has been optional in the the past.

Body styles are in both two-door and four-door types, either streamlined or notched-back, which may be specified in any of 12 solid colors and four two-tone combinations. An interesting new treatment on inside door trim is a gray and spruce blue colored vinyl plastic called Durafab, said to possess excellent resistance to scuffing, cracking, splitting or peeling, as well as being easily cleaned with a damp cloth.

A. E. Barit, president and general manager of Hudson, says:

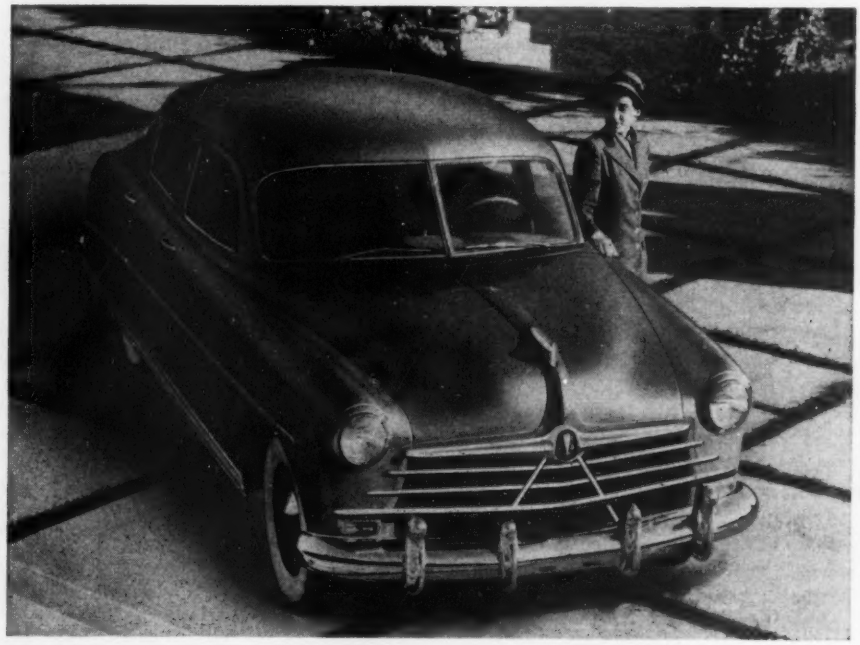
"Hudson would not invade a lower-price field with a pop gun. Here is a block buster—an exciting new automobile no one else in the industry is prepared to build today."

New Pontiac Models Shown

WRAPS were taken off the 1950 Pontiac officially last Friday, after production ground to a halt the day before Thanksgiving. Twenty-eight improvements are listed, although most of them will defy immediate detection. The 8-cylinder engine has ⅛-inch larger bores to increase displacement from 249 to 268 cubic inches and raise horsepower from 104 to 108. Crankshaft rear bearing is slightly larger in diameter and a positive rear bearing oil seal has been added. Increased engine power has dictated a boost in clutch diameter from 9½ to 10 inches on models carrying Synchro-Mesh transmission. Service mechanics are expected to welcome the addition of a tappet access door on the inside of the right front fender. When the door is removed, along with the right front wheels, the engine tappets come into full view for ready adjustment. Rear spring bushings are now of rubber in the interests of reducing shackle pin rattle, road rumble and power transmission noises.

Body Rigidity Improved — Body rigidity has been improved by changing the roof rail from channel to box-type steel section. Door locks have been made more freeze-proof and, as a final touch, the wheel jack and tools are held firmly in rear compartments with the aid of a couple of small coil springs.

Pontiac expects to throw major sales emphasis next year on its two-door 6-cylinder model, the lowest-priced of the line. Utility as a business coupe combined with pleasure car will be stressed. Plant capacity for building 500,000 cars annually stacks up against a production record of probably 330,000 in the current calendar year, so there is still plenty of room to handle more orders if they are forthcoming. Prices on



HUDSON PACEMAKER INVADES LOWER-PRICE FIELD

. . . not a pop gun but a block buster

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new models are unchanged except for a $250 reduction on the all-steel station wagon.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1949	1948
January	445,092	422,236
February	443,734	399,471
March	543,711	519,154
April	569,728	462,323
May	508,101	359,966
June	623,689	454,401
Six mos.	3,134,055	2,617,581
July	604,351	489,736
August	678,092	478,186
September	657,078	437,181
October	605,000*	516,814
November		495,488
December		514,337
12 mos.		5,549,323

* Preliminary.

Estimate for week ended:

	1949	(Same week) 1948
Nov. 5	116,699	118,229
Nov. 12	114,856	116,029
Nov. 19	115,683	120,718
Nov. 26	75,000	89,482

Estimates by Ward's Automotive Reports

1950 Mercury Introduced

THE 1950 Mercury rounds out the list of newcomers in the passenger car field for the past week. In most respects it echoes the improvements made in the Ford line and described here in some detail a week ago. Body styling is basically the same as in 1949, except for decorative touches like nameplates, handles and instrument panel treatment. Upholstery details have been "customized" and a flock of new body colors will be available.

More Automatic Transmissions

THE industry expects a good deal of jockeying next year in the passenger car field over the subject of automatic transmissions, what with Chevrolet and Ford both scheduled to have units available for around $150, Nash and Lincoln continuing to feature Hydra-Matic drive, Studebaker shortly to offer a torque-converter design, Packard extending its Ultramatic to less-expensive models, and Chrysler possibly coming up with something new in this line for Plymouth.

Prices May Drop—With long experience in building Hydra-Matic transmissions for Oldsmobile, Cadillac and Pontiac, and now for Nash and Lincoln, General Motors is expected to move in the direction of lowering the cost of the device. Over a million Hydra-Matics have been produced and it is an old automotive axiom that as production goes up, costs go down. So it will not be surprising to see some shading of the extra charge assessed by Olds and Cadillac for automatic transmissions, Pontiac already having trimmed the charge by $25 to $158.50.

This will not mean, however, any reduction for units supplied Nash and Lincoln, since contracts for the transmission were negotiated at firm prices with these manufacturers and if GM chooses to cut the fee for members of its own family, the result is just that much competitive advantage over outside buyers. Ultimately it could mean Nash and Lincoln will switch to another design, if they can locate one with the desired price and performance characteristics.

Ford Revises Pension Plan

REVISION of Ford Motor Co.'s pension plan for salaried employees has brought it into line with the system going into operation for hourly-rated labor. The basic plan will be non-contributory and applicable to all salaried employees regardless of age and without any waiting period. In addition, each employee receiving a base salary above a stated amount—tentatively $3600 a year—will be entitled, but not required, to participate in a supplementary program for the purchase of additional pension benefits, to be paid for jointly by company and employee. Basic plan provides benefit of $100 a month, including primary federal Social Security, for all employees retiring after 30 years of service at age 65.

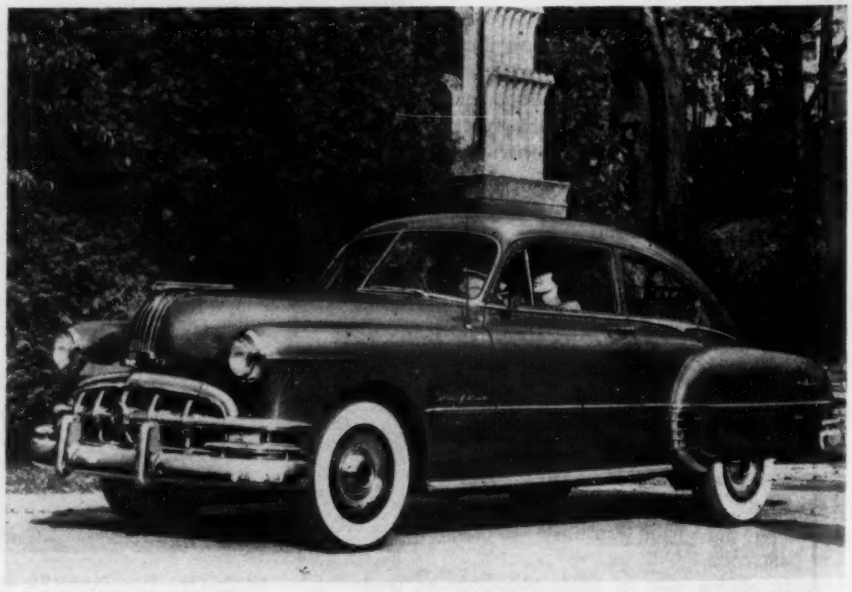
The supplementary program will provide benefits related to the covered portion of the base salary and years of service. Employees will not be able to subscribe to it until they have completed two years of service, but at that time some credit will be given for past service. Revisions in the pension system will become effective Mar. 1, 1950.

Local Settlements Denounced

FROM the parts industry it is reported that a few companies have reached agreements with their union locals for new contracts, the terms including wage adjustments, improved insurance plans and a moratorium on pension demands for five years. The locals, after agreeing, have taken time out to obtain approval "of the international" and then have returned to say the deal was off. The question being asked by managements is whether the control of the international is so strong as to be able to break collective bargaining agreements negotiated and approved by the locals.

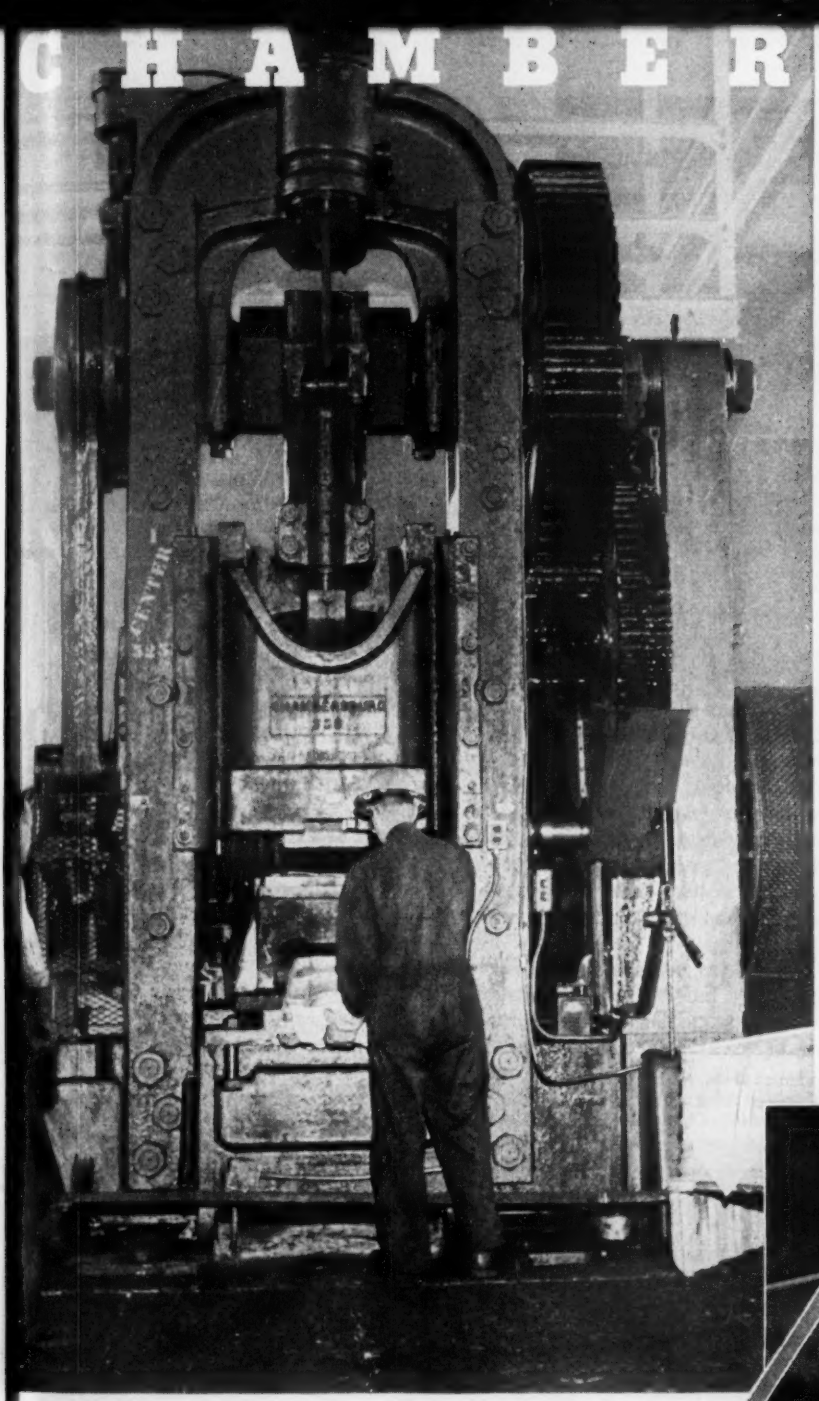
Output at Low Point

CAR and truck assemblies this week will be at the lowest point since the industry converted from wartime operations, for reasons primarily attributable to the steel strike. Closed for varying periods of time are Chevrolet, Buick, Oldsmobile, Pontiac, Chrysler, Dodge, De Soto, Plymouth, Packard, Nash, Lincoln, Kaiser-Frazer, Willys-Overland and Reo.

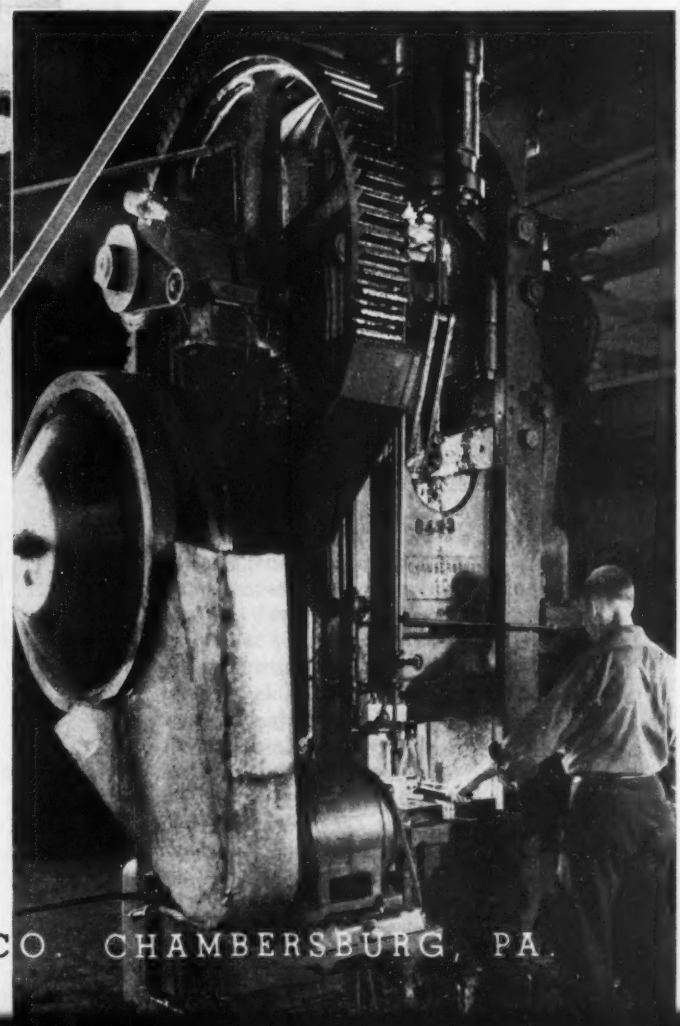


1950 PONTIAC WITH HYDRA-MATIC OR SYNCHRO-MESH TRANSMISSION
. . . emphasis next year on two doors and six cylinders

CHAMBERSBURG



Here is something to consider when in the market for a trimming press:



THE CHAMBERSBURG STEEL SIDE TRIMMING PRESS IS PRACTICALLY UNBREAKABLE!

CHAMBERSBURG ENGINEERING CO. CHAMBERSBURG, PA.

Two Bids Submitted

By American Steel & Tube Corp. to GSA for government-owned steel castings plant

AMERICAN Steel & Tube Corp., Cleveland, O., submitted two bids—the only ones—to General Services Administration for a government-owned steel castings plant at Scullin Steel Co., St. Louis, Mo.

One bid was $1.8 million in cash; the other $2,205,000, 15 per cent of which was to be paid down if the bid was accepted. They will be studied by the War Assets liquidator who is to make recommendations to Jess Larson, agency chief.

American Steel & Tube is a Delaware corporation formed in February of this year with a capitalization of over $1 million. It will manufacture seamless oil well casing, upset tubing and submerged weld expanded linepipe. The company will do its own coupling and threading.

Mark H. Gathmann, president, told STEEL that the company plans to employ from 1000 to 1200 persons. Its annual capacity will be about 150,000 tons of oil well casing and from 150,000 to 200,000 tons of linepipe.

Granite City To Use Oxygen

OXYGEN generators made by Air Products Inc., Emmaus, Pa., will be used to extract the element from the air in Granite City Steel Co.'s operations at Granite City, Ill.

N. P. Veeder, vice president in charge of operations of Granite City, says the generators are the most modern and economical means of supplying the mill's oxygen requirements. He says his company is working on a process which will use the generators' by-product, nitrogen, in certain steelmaking operations.

Miehle Buys Star Electric

MIEHLE Printing Press & Mfg. Co., Chicago, bought all capital stock of Star Electric Motor Co., Bloomfield, N. J.

J. E. Eddy, president of Miehle, says no changes in personnel or policies of Star are contemplated. The present officers of Star will manage Kimble Electric Division of Miehle at Burlington, Iowa. The arrangement will permit Star and Kimble to offer the trade a line of electric motors ranging in size from ½ to 600 hp.

Miehle was established 60 years ago. It has had an interest in Kimble for over 20 years because of the importance of electrical applications in the graphic arts. Star, founded in 1910, has long been an independent motor manufacturer. It features in its line a variety of brake, gear, marine, standard and special motors.

Chemical Corp. Opens New Lab

NEW LABORATORY, complete with modern equipment for research and testing in the metal finishing field, was added by Chemical Corp., Springfield, Mass.

The company manufactures Luster-on Zinc Bright Dip and several other metal finishing specialty products. It distributes a line of platers' equipment and supplies, including Pennsalt cleaners, in New England.

New Outlet for Hyster

HYSTER Co., Portland, Oreg., will formally open its new industrial truck retail sales and service building in San Francisco at the end of this week.

The 10,000-sq ft store is located on a four-lane arterial highway. Complete service for all makes of industrial trucks is provided in the 7200-sq ft maintenance shop, says Ray Ronald, western division sales manager.

On display for visitors will be seven different models of industrial trucks and a number of special-purpose attachments. R. L. Golden is manager. His 18-person staff will handle sales and service in 43 counties of northern California and 11 western Nevada counties.

Safety Awards for Revere

TWO Revere Copper & Brass Inc. plants with records of no accidents for the past year got first place awards from the National Safety Council.

The Chicago Mfg. Division and the Baltimore (Canton, O., plant) Division made the remarkable safety performances. The average frequency rate of accidents reported by plants in the 1948-49 Metals Section Contest sponsored by the council was 10.22.

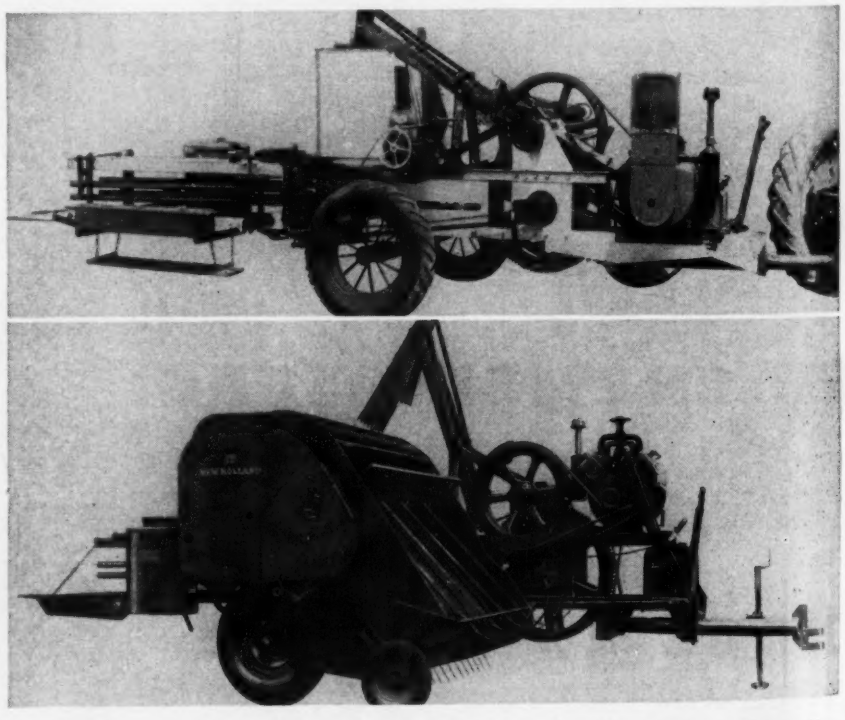
Metallurgists Get Top Pay

METALLURGISTS get the highest pay in the engineering profession.

A survey by the American Society for Metals shows the average income for metallurgists to be $6567, compared with the all-engineering average of $4668 and $4320 for all college graduates.

Aside from those queried who have succeeded to adminstrative and sales positions, the responsibility for metallurgical control over quality and production offers the highest income—a high of $35,000 with an average of $7221.

Salaries range from an average of $3700 after one year out of college to an average of $9000 reached 30 years after getting a college degree.



MECHANIZED HAYMAKING: A decade of farm engineering is shown here. Top view shows one of the first automatic pickup balers brought out by New Holland Machine Co., New Holland, Pa., subsidiary of Sperry Corp., in 1940. The 1950 model, below, has 20 per cent fewer parts, a simplified design and is easier for the farmer to operate and maintain. NEA photo

BRIEFS...

Warner & Swasey Co., Cleveland—turret lathes, single and multiple spindle automatics, tapping and threading machines—appointed Hallidie Machinery Co. to serve W & S customers in Oregon. Hallidie already represents the company in Washington. Harron, Rickard & McCone Co., San Francisco, was appointed to represent W & S under supervision of the newly enlarged factory branch in Los Angeles.

—o—

Southern States Iron Roofing Co., Savannah, Ga., was appointed distributor for Reynolds "Lifetime" aluminum mill products and architectural shapes. Southern States will stock sheet, plate, rod, wire, bar and shapes in a wide range of sizes, thicknesses, alloys and tempers. Sales area of the new distributor includes the 13 southeastern states blanketed distribution-wise by 14 branch warehouses.

—o—

Colonial Broach Co., Detroit—broaches, broaching machines, hydraulic presses and other equipment—appointed F. H. Harris Co., Worcester, Mass., New England sales and service representative.

—o—

General Controls, Glendale, Calif. — automatic, pressure, temperature, level and flow controls—opened new factory branch office facilities in Minneapolis, Buffalo and Baltimore. Branch managers in the newly opened offices are: R. Roger Rosell Jr., Paul A. Palmgren and Fred H. Angier, respectively.

—o—

Kenmar Co. began business as a custom steel fabrication firm in Berkeley, Calif. It will serve the Coast eastward to Colorado. K. S. Keese, secretary-treasurer of San Jose Pipe and Tank Co., is manager of the new company.

—o—

Sylvania Electric Products Co. Inc., New York — photographic, lighting, radio and electronic equipment—plans to establish a warehouse and assembly plant for its products in the San Francisco area. The company also will erect a similar plant at Vernon, a suburb of Los Angeles.

—o—

Changes in titles of **Henry J. Kaiser** enterprises continue. Permanente Metals Corp. is now Kaiser Aluminum & Chemical Corp. The sales subsidiary, Permanente Products Co., is Kaiser Aluminum & Sales Inc. Mr. Kaiser says aluminum orders for delivery in November were at a record high. Shipments this month will be the largest in the company's history.

TWELVE YEARS IN TWO MONTHS: Prof. R. S. Jensen of the University of Illinois tests rail joint bars in a machine that telescopes 12 years of wear into two months. Redesigned bars have considerably longer life than older models. Since bars cost $5 a pair and there are 273 joints to each railroad mile, the new bars save railroads a lot of money. NEA photo

—o—

Kaiser Industries Inc. through its Kaiser Gypsum Division acquired Standard Gypsum Co., Long Beach, Calif., and another gypsum plant at Redwood City, Calif.

—o—

Port Weller Drydock Co. will construct a 654-ft freighter, largest Canadian ship to ply the Great Lakes. Colonial Steamships Ltd. signed a contract for the 13,000-ton bulk carrier which will be built at Port Weller, Ont.

—o—

Industrial Oil Division of Swift & Co. will move its administrative offices from Chicago to Hammond, Ind. The move will be completed by yearend.

—o—

Alabama Pipe Co.'s new plant for manufacture of centrifugally cast iron water pipe was completed at Anniston, Ala., by Rust Furnace Co., Pittsburgh, the designer-constructor. The furnace, a continuous conveyor type, has a capacity of 100 tons of pipe in eight hours.

—o—

Pennsylvania Transformer Co. paid War Assets of the General Services Administration about $1 million for the wartime aluminum plant in Canonsburg, Pa. Pennsylvania Transformer, erstwhile Pittsburgh concern, occupies part of the plant. Departments of Continental Can Co., National Metal Products Co., Radio Corp. of America, National Can Co. and L. H. Smith Hardware Co. occupy other parts of the plant under a subleasing arrangement with the transformer company.

—o—

Whiton Machine Co., New London, Conn., appointed Anderson & White Supply Co., Chicago, Ill., as its agent to handle sale of lathe chucks and centering machines. Standard Equipment & Supply Co., Hammond, Ind., is a new Whiton representative for the sale of lathe chucks.

—o—

Allied Foundry Co. Inc., Jersey City, N. J., was organized to operate the former plant of American Foundry & Castings Co. in production of soil pipe. The company expects to get underway in February with a daily production of 45 tons and work up to 70 tons.

—o—

Clyde Porcelain Steel Co., Clyde, O., was granted a $500,000 loan by Reconstruction Finance Corp. The loan assures the company of working capital; it will make it possible to install modern machinery.

—o—

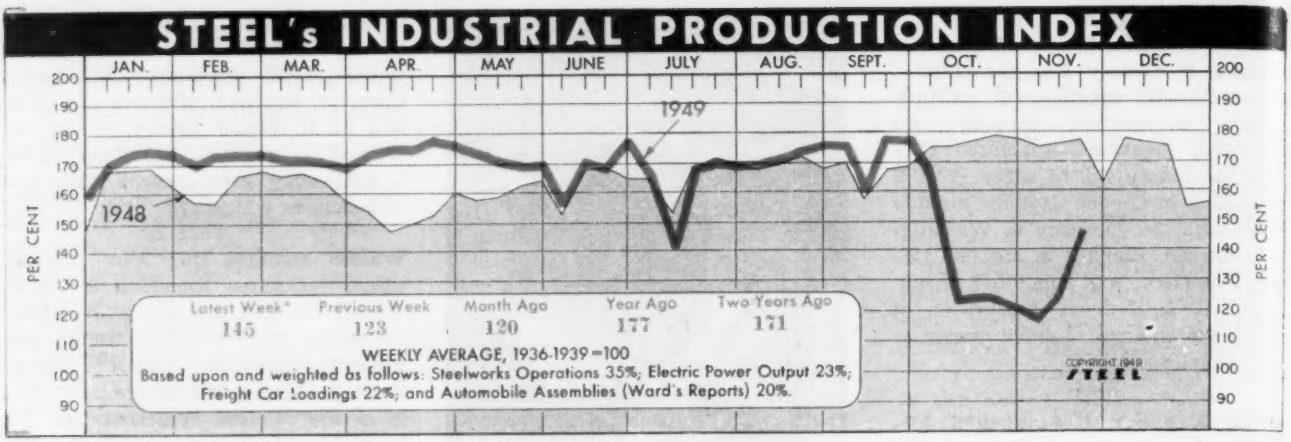
Weirton Steel Co.'s Julius H. Strassburger, manager of the service and maintenance department, and William F. McGarrity, assistant to the manager of Weirton's Steel Works, left for Europe. They will study the use of oxygen in steelmaking and other phases of European steel practice. Because of the low grade of European coal and ore, the use of oxygen in steelmaking has been highly developed there.

—o—

Arthur Colton Co., Detroit—pharmaceutical and packaging machinery—appointed Miller Sales Co., Cincinnati, representative in Chicago and surrounding territory. Miller continues to represent Colton in Cincinnati and a large area in the Midwest.

—o—

Process Industries Engineers Inc., Pittsburgh—specialist in design, application, contracting, servicing and sale of complete equipment for processing industries—appointed W. A. Coyle western New York district manager. Companies represented through the western New York office are: Patterson-Kelley Co., International Engineering Inc., Warren Steam Pump Co., Hetherington & Berner Inc., B. H. Hubbert & Son Inc., Gruendler Crusher & Pulverizer Co., Tri-Clover Machine Co., Waukesha Foundry & Machine Co., and Rietz Mfg. Co.


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1948
1949
PER CENT
Latest Week* 145
Previous Week 123
Month Ago 120
Year Ago 177
Two Years Ago 171
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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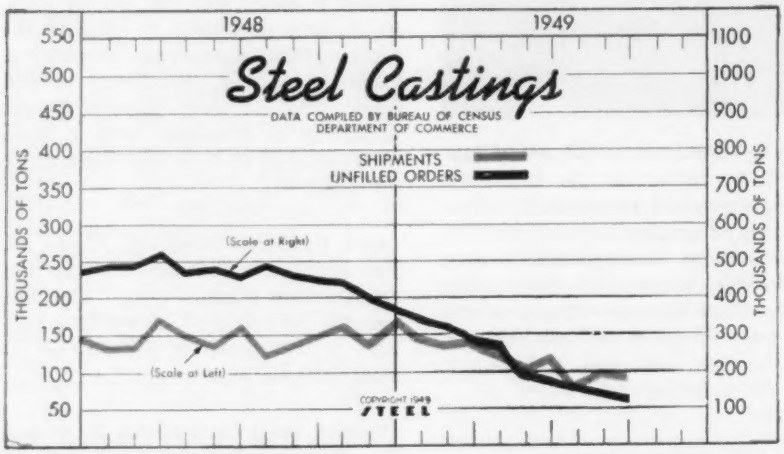
*Week ended Nov. 19 (preliminary).

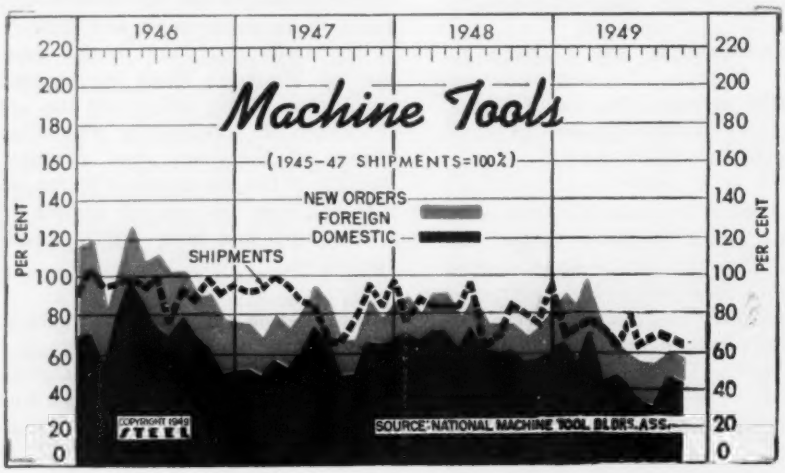


Steel Castings

(Net tons in thousands)

	Shipments			Unfilled Orders*		
	1949	1948	1947	1949	1948	1947
Jan.	140.6	141.1	139.0	338.9	491.7	365.5
Feb.	135.0	142.4	125.6	320.2	497.1	421.4
Mar.	138.9	162.9	134.9	284.8	508.8	434.9
Apr.	120.0	150.3	144.2	250.5	472.4	427.6
May	106.2	143.3	140.9	191.5	482.5	443.2
June	116.1	152.9	139.0	173.2	470.0	445.5
July	78.7	120.4	117.0	155.5	497.4	473.9
Aug.	90.0	140.2	120.4	143.6	472.5	478.6
Sept.	86.5	149.2	137.4	127.7	448.0	526.2
Oct.	....	153.0	148.4	....	424.5	497.3
Nov.	....	146.8	130.1	....	395.0	493.3
Dec.	....	157.4	148.1	....	354.5	489.4

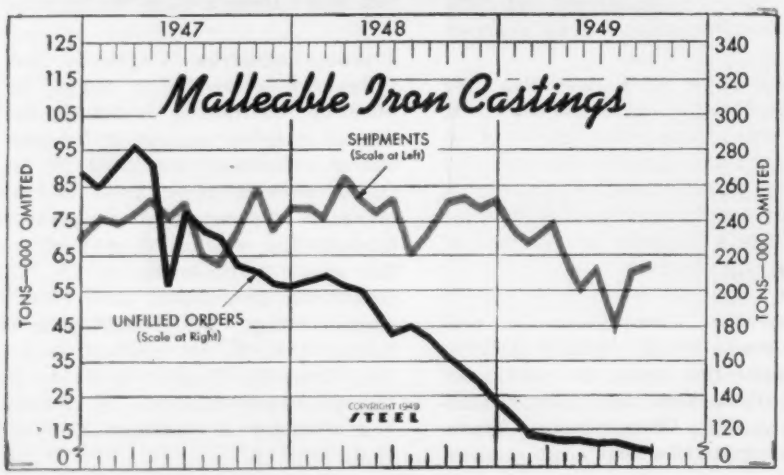
*Castings for sale.



Machine Tool Indexes

(1945-1947 Shipments = 100)

	Orders				Shipments	
	Total		Domestic			
	1949	1948	1949	1948	1949	1948
Jan.	87.0	83.1	65.1	69.1	68.8	75.3
Feb.	80.9	77.3	54.4	64.6	70.3	87.1
Mar.	93.5	86.3	71.2	70.2	75.8	83.6
Apr.	70.1	86.3	47.0	72.2	74.7	82.0
May	63.7	73.5	47.9	62.1	72.8	82.6
June	53.6	83.4	38.0	71.5	79.0	94.4
July	48.0	74.0	34.0	61.1	60.7	62.4
Aug.	51.5	73.7	32.7	60.9	67.3	69.8
Sept.	57.7	73.1	44.0	61.5	67.6	84.7
Oct.	56.8	67.4	43.0	53.4	62.3	80.4
Nov.	...	72.2	...	54.1	...	76.2
Dec.	...	76.7	...	60.5	...	96.9



Malleable Iron Castings

(Net tons in thousands)

	Shipments		Unfilled Orders*	
	1949	1948	1949	1948
Jan.	71.9	77.7	126	206
Feb.	66.7	75.2	118	209
Mar.	72.1	86.8	102	203
Apr.	61.3	80.6	95	200
May	54.6	76.1	79	192
June	59.6	81.7	70	179
July	44.4	64.9	71	180
Aug.	58.1	73.3	61	177
Sept.	60.5	77.8	58	164
Oct.	...	81.8	...	158
Nov.	...	77.2	...	146
Dec.	...	79.9	...	137
Total	...	933.1	...	...

* Castings for sale.

The Business Trend

SHARP rise of the steelmaking rate resulted in STEEL's industrial production index for the week ended Nov. 19 climbing 22 points over the level of the preceding week to 145 per cent (preliminary) of the 1936-1939 average. Despite the sizable gain in the latest week, the index is still 16 points below the level of the last prestrike week and 32 points below the corresponding week in 1948.

STEEL—With most of the nation's steel producers back to work the ingot rate for the week ended Nov. 19 jumped to 56 per cent of capacity from 24 per cent in the preceding week. Another healthy increase is expected in the current week up to a point slightly below the last prestrike week.

AUTOMOBILES—Although the steel strike is just a memory for most basic steel producers, its effects are still being felt by the automobile industry. Strike loss to the industry is placed at about 475,000 vehicles, based on the amount of vehicles now expected to be built in 1949 as against the volume that would have been achieved had there been no strike. The estimated total consists of 425,000 passenger cars and 50,000 trucks. In the week ended Nov. 19 outturn was 115,683 units, up about 800 over the 114,856 assemblies in the preceding week. Effects of the steel strike, end of 1949 model runs and the Thanksgiving holiday suspension will cause assemblies for the current week to drop sharply. Outlook for December production is not too bright. Assemblies in the last month of this year are expected to total about 350,000 passenger cars and trucks with full scale production deferred until after the first of next year.

COAL—Resumption of coal mining during the week ended Nov. 12 resulted in a gain in bituminous coal output to 7.1 million net tons from 2,680,000 tons in the preceding week. Miners worked three days in mines that had been strike bound to effect a gain of about 4.5 million tons over the average for the strike period.

CONSTRUCTION—Ending a six-week slump, civil engineering construction volume rose to $217,758,000 in the week ended Nov. 17 for the fourth largest weekly contract total for the year to date. During the preceding six-week period weekly awards averaged only $139 million. Private construction for the week was $117,449,000 and public construction was $100,309,000.

RAILROADS—Class 1 railroads installed 1577 locomotives in the first ten months of 1949, the greatest number for any corresponding period since 1923, says the Association of American Railroads. The number put in service so far this year includes 1524 diesel and 53 steam locomotives. On order on Nov. 1 were 812 diesel, 17 steam and 4 electric locomotives.

PRICES—Bureau of Labor Statistics wholesale price index was unchanged in the week ended Nov. 15 at 151.5 per cent of the 1926 average. It is currently 0.4 per cent below 4 weeks ago and 7.6 per cent below the comparable week of 1948.

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	56.0	24.0	9.5	99.0
	Electric Power Distributed (million kilowatt hours)	5,450‡	5,435	5,430	5,627
	Bituminous Coal Production (daily av.—1000 tons)	1,183	447	398	2,062
	Petroleum Production (daily av.—1000 bbl)	5,150‡	5,185	5,072	5,690
	Construction Volume (ENR—Unit $1,000,000)	$217.8	$111.3	$121.5	$123.2
	Automobile and Truck Output (Ward's—number units)	115,683	114,856	143,049	120,718
	*Dates on request. †1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons. ‡Preliminary.				
TRADE	Freight Car Loadings (Unit—1000 cars)	725†	636	589	857
	Business Failures (Dun & Bradstreet, number)	190†	222	181	126
	Money in Circulation (in millions of dollars)‡	$27,397	$27,528	$27,427	$28,215
	Department Store Sales (changes from like wk. a yr. ago)‡	−9%	−2%	−12%	−9%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$12,916	$11,234	$15,216	$13,423
	Federal Gross Debt (billions)	$256.9	$256.8	$256.6	$252.5
	Bond Volume, NYSE (millions)	$20.6	$12.2	$15.9	$16.3
	Stocks Sales, NYSE (thousands of shares)	7,420	4,317	6,628	5,176
	Loans and Investments (billions)†	$66.7	$66.7	$66.2	$62.4
	United States Gov't. Obligations Held (millions)†	$37,042	$37,388	$37,300	$33,319
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	152.52	152.52	152.52	151.86
	STEEL's Nonferrous Metal Composite‡	169.3	171.6	169.1	232.3
	All Commodities†	151.5	151.5	152.1	164.0
	Metals and Metal Products†	169.4	169.3	169.2	173.6
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				

Men of Industry

STEPHEN C. MAY

W. E. LUNGER

JOHN S. ROLLER

Stephen C. May has been named vice president and general sales manager of **Blackmer Pump Co.,** Grand Rapids, Mich. Mr. May formerly served as consulting sales counselor with Auto-Soler Co., in sales executive capacities with Pacific Mfg. Corp. and Iron Fireman Mfg. Co., and as vice president and sales manager of Darling Valve & Mfg. Co.

—o—

Melvin O. Monsler has been appointed sales manager, P & H Welding Division, **Harnischfeger Corp.,** Milwaukee. He has been associated with the company for 12 years, serving for four years as assistant sales manager of the division, and one year as welding product service engineer. He is succeeded by **A. G. Hendrickson** as assistant sales manager of the welding division. Mr. Hendrickson formerly was a welding engineer in the Milwaukee-Minneapolis territory.

—o—

Metal & Thermit Corp., New York, has appointed **Bernard W. Weber** manager of its detinning and electrode manufacturing plant at East Chicago, Ind. He formerly was manager of the Seattle plant of American Can Co. **W. S. Leinhardt,** formerly general superintendent, East Chicago plant, is now at Metal & Thermit's executive offices in New York as technical assistant to the vice president of production. **William C. Cuntz,** manager, Pittsburgh sales office and warehouse, has been made district manager at Chicago. **Orville T. Barnett,** manager, Newark, N. J., office, has been appointed Pittsburgh district manager. **Robert T. Brown,** who headed technical service on both electrodes and Thermit, has been made district manager at Newark.

W. E. Lunger, district manager of the Huntington, W. Va., plant of **American Car & Foundry Co.,** has been appointed assistant vice president in charge of production, with headquarters in New York. **J. E. Koontz,** assistant district manager at the Huntington plant, succeeds Mr. Lunger as manager.

—o—

Harry C. Bickler has been elected secretary and treasurer of **Globe Steel Tubes Co.,** Milwaukee. He succeeds **George O. Ross,** retired after 27 years' association with the company. Mr. Bickler has been with Globe Steel Tubes since 1922, starting as a cost clerk, and subsequently becoming chief clerk of the accounting department, and in 1928, assistant treasurer. **Joseph S. Nigrelli,** former works accountant, was elected to succeed Mr. Bickler.

—o—

B. Thor Bjornstad has been named district engineer in the Pacific Northwest by **Austin Co.,** Cleveland. He joined the company as a structural engineer on its special staff at Sand Point Naval Station in 1940.

—o—

Fred L. Hopf, sales manager, Wausau, Wis., **Dynamatic Corp.,** division of Eaton Mfg. Co., Cleveland, has been named general manager of the Wausau plant, succeeding **Charles Hayes,** resigned.

—o—

William C. Burton has been appointed Pacific district sales manager for the American Manganese Steel Division of **American Brake Shoe Co.,** New York. **Robert H. Elem** also was appointed Pacific Coast manager, welding products department.

John S. Roller has joined **Republic Supply Co.,** Houston, as general manager of sales. He formerly was assistant sales manager of the Birmingham district for Republic Steel Corp. **Don L. Collins,** formerly executive vice president and general manager of sales, will continue his duties as executive vice president for Republic Supply Co.

—o—

T. F. Wilson has been appointed manager of the operating supplies division, **American Car & Foundry Co.'s** purchasing department. He has been with ACF since 1916, and replaces **G. E. Thompson,** resigned.

—o—

Elmer F. Franz has been elected treasurer, **Yale & Towne Mfg. Co.,** New York, succeeding **Fred Dunning,** treasurer since 1933, who will devote full time to his increased responsibilities as executive vice president and secretary. Mr. Franz resigned as comptroller of Weatherhead Co., Cleveland, with which he was associated for the last seven years.

—o—

L. H. Perry has been named to head the hydraulic department, **Holyoke Machine Co.,** Holyoke, Mass. He formerly was with James Leffel & Co., Springfield, O., as mechanical engineer, designing hydraulic turbines for both government and private power plants, and prior to that was with Charles T. Main, engineer, Boston, supervising the design of hydraulic and mechanical equipment for government power plants. He also had been hydraulic engineer, water wheel department, Rodney Hunt Machine Co.

—o—

Harold Anschuetz has joined the staff of **Ken Cook Co.,** Milwaukee, as pro-

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"Popcorn and Push-Ons"

. . . a story of product redesign using 4 Push-On Type SPEED NUTS to eliminate 14 operations . . . cut material costs 30%!

How to keep the "lid" on the retail price of their new, distinctive popcorn popper was a problem faced by Popex, Inc., Cincinnati, Ohio.

This meant watching production costs carefully. For instance, the cost of attaching the metal legs to the base seemed out of line. Alternate methods were considered, and Push-On Type SPEED NUTS combined with plastic legs provided the best, fastest and most economical solution. This combination eliminated 14 assembly operations and reduced material costs 30%!

From popcorn poppers to passenger cars, SPEED NUT brand fasteners are proving their value—in faster, easier assembly, lower costs and better product design. A Tinnerman Fastening Expert can show you how to gain these benefits. Contact him by phone. Also, write for your copy of SPEED NUT Savings Stories—actual case histories of cost savings. TINNERMAN PRODUCTS, INC., 2040 Fulton Road, Cleveland 13, Ohio. In Canada: Dominion Fasteners, Ltd., Hamilton.

BEFORE: The original Popex design called for use of metal legs, blanked, formed and plated. Also required plastic bumper buttons attached with rivet and washer. Two rivets attached each leg to base plate.
AFTER: Plastic legs having integral studs are inserted through punched holes in side of base plate. Push-On SPEED NUTS are zipped over studs with hand tool. SPEED NUT prongs "bite" into plastic, holding leg securely.
Popex
TINNERMAN Speed Nuts

duction engineer. He previously was with Falk Corp.

—o—

General Electric Co., apparatus department, Schenectady, N. Y., has promoted **Neil Currie Jr.** from manager of manufacturing to administrative assistant to the general manager; **Ernest E. Johnson,** from manager of engineering to manager of engineering, large apparatus divisions; **Carl A. Salmonsen,** from manager, aircraft gas turbine divisions, to manager of manufacturing, large apparatus divisions; **Byron A. Case,** from assistant to manager of engineering, to manager of engineering, small apparatus divisions; **Frank T. Lewis,** from manager of manufacturing, aeronautic and ordnance systems divisions, to manager of manufacturing, small apparatus divisions; **Clarence H. Linder,** from assistant manager of manufacturing to assistant to the general manager; and **C. W. LaPierre,** from assistant manager, aircraft gas turbine divisions, to manager of that division.

—o—

Joseph Harwood was named to manage the brake shoe division, **Pick Mfg. Co.,** West Bend, Wis., and will have headquarters in the company's Detroit office. He formerly headed the bonded brake shoe division of LRC Co., Detroit.

—o—

Kenneth F. Ode has been appointed manager, Findlay Division, **Gar Wood Industries Inc.,** Wayne, Mich. He has been works manager, Trackson Co., Milwaukee.

—o—

Joseph Druliner has been appointed chief industrial engineer of **Northrop Aircraft Inc.,** Hawthorne, Calif. He previously was chief industrial engineer and factory superintendent for Consolidated Vultee Aircraft Corp. in San Diego, Calif., and was manager of the industrial engineering department, Lockheed Aircraft Corp., Burbank, Calif. More recently he was employed in the industrial engineering department, Douglas Aircraft Inc., Santa Monica, Calif.

—o—

Gulf Oil Corp., Pittsburgh, general sales department, has appointed **John F. Walton Jr.** general sales manager of special accounts and federal government sales of all products; **John P. Knight,** assistant general sales manager; **L. F. Craig,** general sales manager of special products; **R. C. Arnold,** general sales manager of extra-divisional market development; **M. J. St. Clair** has been named administrative assistant to assist **R. M. Bartlett,** vice president of general sales, in the company's general sales program. Named regional managers in the general sales department are **R. B. James,** Boston; **John Pennywitt,** New York; **J. A. Guyton,** Jacksonville, Fla.; and **H. P. Roby,** Chicago.

—o—

E. S. Wayland, vice president in charge of sales, **American Brass Co.,** Waterbury, Conn., will resign Jan. 1 after 34 years' association with the company. He is a director of Waterbury Buckle Co. and Eastern Malleable Iron Co.

—o—

Douglas Dalton has retired as assistant general manager, Stamford Division, **Yale & Towne Mfg. Co.,** at Stamford, Conn., after 34 years of service. He will continue in a consulting capacity.

—o—

Otto Doerner has been elected vice president in charge of manufacturing and engineering, **Cummins Business Machines Corp.,** Chicago. He will be responsible for production and engineering activities of the portable tool division as well as those of the business machines division. Before joining Cummins more than two years ago, Mr. Doerner was with National Cash Register, Zenith Radio and International Register.

OTTO DOERNER

—o—

S. R. Francis, founder of **Metals & Alloys Ltd.,** Toronto, Ont., Canada, has relinquished the directive management of the business but continues in an active consultant capacity as chairman of the board. **F. J. Francis,** formerly vice president, has been elected president and general manager. **E. G. Jennings,** sales manager, has been named vice president and general sales manager.

—o—

W. M. Bellemore has been named ballistic engineer at **Winchester Repeating Arms Co.,** New Haven, Conn., succeeding **Merton A. Robinson,** retired after 45 years of service.

—o—

Harris Fiestal, formerly New York district manager of Charles Dreifus Co., has announced formation of **Harris Fiestal Co.,** with offices at 61 Broadway, New York. The new firm will engage in scrap brokerage and new steel distribution. Associated with Mr. Fiestal will be his son, **Henry Fiestal, Frank Fry** and **Robert A. Himelfarb.** Mr. Fry and Henry Fiestal will assist in the scrap brokerage works, and Mr. Himelfarb will concentrate on new steel sales.

—o—

Speedi-Dri Corp., Washington Square, Philadelphia, is a new firm headed by **R. H. Hubbell Jr.,** president; **Warren E. Sawyer Jr.,** vice president, secretary and treasurer; and **R. A. Hogan,** sales manager. It will market oil and grease absorbents known as Speedi-Dri and Sol-Speedi-Dri in the New England states, New York, eastern Pennsylvania and part of New Jersey. All sales will be handled by the New York office, No. 1 Wall St.

—o—

H. Gordon Smith has been named Pacific district sales manager of the appliance and merchandise department of **General Electric Co.,** Schenectady, N. Y.

—o—

Frank R. Plum has been name director of sales, **American Machine & Foundry Co.'s** bakery division, New York. He joined the company 20 years ago as a member of the bakery division sales organization. Mr. Plum succeeds **Martin Miller,** resigned.

—o—

Walter A. Mogensen, vice president and treasurer of **Avco Mfg. Corp.,** New York, has been named a director of the corporation. **James D. Shouse** was elected a member of the executive committee, and **William M. Werner** was elected a vice president.

—o—

Chemical Corp. of Springfield, Mass., announces that **John Kosmos,** a member of the Electrochemical Society and the AES, has joined its staff as technical service man, heading its new laboratory and available for consultation on the metal finishing problems of its customers. Mr. Kosmos has been actively engaged in material control, process control, metallurgy and metallography with such companies as Pratt & Whitney and Underwood.

—o—

Gaylord Poeschl has been appointed plant engineer for **Heil Co.,** Milwaukee. Formerly engineer at Heil,

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he succeeds **Ray Leary,** who recently was selected as chief engineer and general manager of City and Metropolitan Sewerage Commission, Milwaukee.

—o—

L. B. Taylor has been appointed gen-

L. B. TAYLOR

eral sales manager, **Friden Calculating Machine Co. Inc.,** San Leandro, Calif. He has been serving as the company's domestic sales manager.

—o—

Raymond J. Shillum has been elected a member of the board of directors and appointed vice president in charge of sales, **Brown-Hutchinson Iron Works,** Detroit. He was sales manager directing the alloy sales division. Mr. Shillum has been with Brown-Hutchinson two years and was formerly with the metallurgical and heat treating division of Ford Motor Co. for 25 years.

—o—

Walter A. Kesterke has been appointed sales representative for industrial grinding wheels in Wisconsin and southwest Michigan for **United States Rubber Co.,** New York. He has had 20 years' experience in malleable iron and steel foundries, having been foundry superintendent of Edgewater plant, Auto Specialties Mfg. Co., and foundry engineer with Benton Harbor Malleable Industries at Benton Harbor, Mich. He will have headquarters in Milwaukee.

—o—

National Electrical Manufacturers Association, New York, announces new elections: **C. T. Lawson,** vice president in charge of sales, Kelvinator Division, Nash-Kelvinator Corp., Detroit, was elected president, succeeding **B. W. Clark,** vice president of sales, Westinghouse Electric Corp., Pittsburgh. **C. W. Higbee,** manager, electrical wire & cable department, U. S. Rubber Co., was elected vice president, as were **J. H. Jewell,** vice president, Westinghouse Electric Corp.; **James F. Lincoln,** president, Lincoln Electric Co., Cleveland; **E. E. Potter,** vice president, General Electric Co., New York; and **A. F. Sheldon,** vice president and general manager, Kennecott Wire & Cable Co., Phillipsdale, R. I. **Everett Morss,** president and treasurer, Simplex Wire & Cable Co., Cambridge, Mass., was elected treasurer.

—o—

J. O. Clevenger has been appointed manager of the welding department, **Westinghouse Electric Corp.,** Pittsburgh. In 1939 Mr. Clevenger became manager of the construction and communication section. He was transferred to Atlanta as manager of agency and specialty sales for the southeastern district in 1947, and was located there until recently.

—o—

A. M. Shaw has been appointed as-

A. M. SHAW

sistant manager, pump and compressor merchandising division, **Worthington Pump & Machinery Corp.,** Harrison, N. Y. He will be responsible for development of pump and compressor sales to original equipment manufacturers. His activities will come under supervision of **J. O. Glenn,** manager of the division.

—o—

Irving G. Meyer has been named consumer sales manager, and **John Stolarz,** manager of Multiplex sales for Power Tool Division, **Rockwell Mfg. Co.,** at Milwaukee. Mr. Meyer, affiliated with the division since 1942, was assigned in 1945 to the Pacific Northwest territory as district sales manager with headquarters in Seattle. He returned to Milwaukee in 1949 to head the new consumer sales department. Mr. Stolarz resigned from De Walt Inc. in August to join Rockwell. He served with the former company as sales manager in charge of export work, sales promotion and advertising, as well as sales.

—o—

F. P. Taugher has been appointed manager of engineering, industrial control division, **Westinghouse Electric Corp.,** at Buffalo. He has been engineering and service manager in the company's New England district for the last five years. **M. L. Gardner** was appointed engineering and service manager in New England, with headquarters in Boston, succeeding Mr. Taugher.

—o—

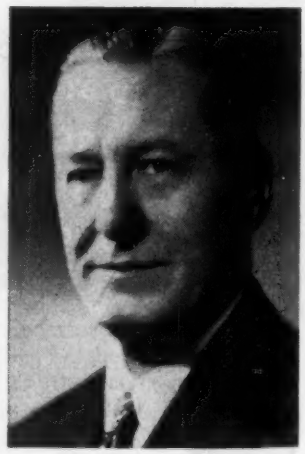
R. W. Kimberlin has been appointed San Francisco district manager for **Graybar Electric Co.,** New York, succeeding **J. P. Carson,** who will retire Jan. 1 on the company's service pension. Mr. Kimberlin has been St. Louis district manager, and has been associated with the company 29 years, 24 of which have been spent in the San Francisco district. **C. S. Powell** has been appointed to succeed Mr. Kimberlin in St. Louis. He has been in charge of telephone, radio and appliance sales in the company's general department.

—o—

McKinsey & Co., management consultant, New York, announces appointment of **Robert P. Neuschel** to its New York staff as a consultant in manufacturing. Mr. Neuschel has been with Sylvania Electric Products Inc. since 1947, both in its New York office and Warren, Pa., plant. **Robert Jerrett Jr.** was appointed to McKinsey & Co.'s New York staff as a marketing consultant, and **Thomas C. Palmer** as a retailing consultant.

—o—

Paul M. Arnall has been appointed



PAUL M. ARNALL

vice president and general manager of **Lunkenheimer Co.,** manufacturer in Cincinnati of valves and engineering appliances and will assume duties Jan. 3, at which time management

organization will consist of **Frank P. Rhame,** president; **Paul M. Arnall,** vice president and general manager; **Harry A. Burdorf,** vice president-sales; **Edmund P. Lunken,** vice president; **Chester C. Isekeit,** treasurer; and **Charles W. Burrage,** secretary.

—o—

A. A. Silverman has been elected president and general manager, **Vilter Mfg. Co.,** Milwaukee. He succeeds **E. B. Tilton,** president, general manager and treasurer, who remains as management consultant. Mr. Silverman was previously vice president. **B. J. Fridl** has been elected vice president in charge of manufacturing, and **M. F. Grady,** comptroller, was elected treasurer.

—o—

Joseph A. Russell, freight traffic manager, **Erie Railroad,** in Chicago, has been appointed to the newly created position of western traffic manager. His headquarters will be in Los Angeles.

—o—

S. M. Weingast has been elected president and general manager of **Precision Apparatus Co. Inc.,** Elmhurst, Queens, N. Y., maker of test equipment for all phases of radio-electronics. He formerly was secretary-treasurer and director of purchasing. **G. N. Goldberger,** formerly chief engineer, was appointed vice president in charge of engineering and treasurer; **J. M. Kirschbaum,** elected vice president in charge of sales; and **A. S. Weingast,** named secretary and director of purchasing.

A. J. LAPOINTE

A. J. Lapointe, a veteran of 25 years in chemical engineering research, has been appointed manager of the process engineering laboratory of **Lincoln-Mercury Division,** Ford Motor Co., Detroit. He spent several years in Detroit developing automobile finishes for a number of car manufacturers. He resigned as technical director of Egyptian Lacquer Mfg. Co., South Kearny, N. J., to join the Lincoln-Mercury division.

—o—

Eric Dudley has been named manager of aviation development and manager of the Pacific Coast district of **Tinnerman Products Inc.,** Cleveland. Mr. Dudley, who has served since 1946 as a sales engineer in the Tinnerman Detroit office, was active from 1930 in the development of military aircraft. Prior to joining Tinnerman organization in 1946, he was production manager of Boots Aircraft Nut Corp., Stamford, Conn., and before that was assistant to the director of engineering for Curtiss-Wright Corp., aviation division, Columbus, O. In his new position he will have headquarters in Los Angeles.

—o—

Creston E. Kite has been named general manager, **Unistrut Eastern Service Co.,** Irvington, N. J. He formerly was vice president in charge of sales, General Alloys Co., Boston. The service company is a branch of Unistrut Products Co., Chicago, specializing in metal framing used extensively in the construction industry. Mr. Kite, in addition to managing the warehouse operation, will supervise sales, service and engineering for Unistrut's new eastern branch.

—o—

Paul A. Girod has been appointed resident salesman in the Philadelphia office of **Berger Mfg. Division,** Canton, O., Republic Steel Corp. He worked in the Berger general sales department six months before entering the armed services, and after three years returned to Berger as a sales trainee.

—o—

H. V. Churchill, chief of the analytical chemistry division of the New Kensington, Pa., research laboratories, **Aluminum Co. of America,** Pittsburgh, has been selected to receive the 1949 Pittsburgh Award by the Pittsburgh section of the American Chemical Society.

OBITUARIES...

William H. Sharpe, 50, sales production manager, **Rome Cable Corp.,** died Nov. 16 at Rome, N. Y. He previously was associated with General Cable Co. in Buffalo, and was one of the founders of Rome Cable Co.

—o—

Israel A. Simon, 66, industrialist, died Nov. 17 at his home in Beverly Hills, Calif. For 25 years he was president, **Duquesne Smelting Corp.,** Pittsburgh. He also was chairman of the board of General Armature Corp. and American Forge & Mfg. Co., and vice president and director of Copperweld Steel Co. He was a member of the Non-Ferrous Metal & Ingot Institute of the United States and secretary of Falk Foundation for 20 years.

—o—

Daniel B. DeLand, 64, assistant to the vice president in charge of manufacturing, **American Can Co.,** New York, died Nov. 14.

—o—

Harry R. Donald, 67, active in the foundry equipment supply business in Milwaukee for nearly 40 years, died Nov. 15 of a heart attack. He helped organize the **Interstate Supply & Equipment Co.,** Milwaukee, in 1929, and since 1931 served as its president.

—o—

Frank M. Smith, 68, general service manager, **Monroe Calculating Machine Co.,** Orange, N. J., died Nov. 16.

—o—

George H. Knebusch, 66, for 20 years plant superintendent, **Cleveland Steel Tool Co.,** Cleveland, died Nov. 17. He retired a year ago.

—o—

Eugene H. Pfeiffer, 52, plant manager of the Rochester, N. Y., branch of **Brace, Mueller & Huntley,** steel products, died Nov. 18. He formerly was manager of the Buffalo plant of the firm, and was transferred to the Rochester plant five years ago.

—o—

Frank J. Tollon Sr., 77, founder and treasurer, **American Boiler Works,** Erie, Pa., died of a heart attack Nov. 16. He founded the firm over 40 years ago.

—o—

Charles A. Brauchler, 82, president and general manager, **Canton Drop Forging & Mfg. Co.,** Canton, O., died recently.

—o—

Joseph R. Freifield, 57, secretary, **State Metals & Steel Co.,** Canton, O., died Nov. 13 following a heart attack.

—o—

Robert F. Crudginton, 68, industrial engineer and former works manager, **Underwood-Elliott-Fisher Co.,** Bridgeport, Conn., died of a heart attack in Harrisburg, Pa., Nov. 13.

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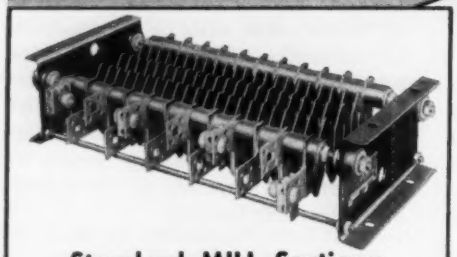
1 - STABILIZES the resistance value.

2 - ELIMINATES TROUBLE in concealed areas.

OFF-SET in each plate gives Intimate Contact at grid-eyes SPOT-WELDS insure continuous path independent of clamping-nuts



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2. Capacities up to 150 amperes per section. External paralleling of sections for larger capacities as needed.
3. Uniform mounting-hole dimensions.
4. Replacement simplified — taps in place for affixing external leads.

Usually mounted overhead or in other remote locations, electrical resistors often receive little inspection or preventative maintenance until the damage has been done. But now, the problem of burning at grid-eyes, at tap-plates, and the need for periodic tightening of clamping-nut pressure is eliminated with EC&M *TAB-WELD* Plate Resistors.

Unlike previous resistor-sections depending on end-nuts for contact-pressure, these new EC&M Resistors are designed with *Tab-ends* which are spot-welded to give a *continuous* path throughout each section. Tap-plates also, are welded in position at frequent intervals for affixing external leads. Only EC&M *TAB-WELD* Plate Resistors offer these improvements for lower up-keep—prolonged life. *And don't overlook the corrosion-resistant properties of these steel plate resistors.*

When replacing existing installations or making new layouts, use EC&M Bulletin 942 *TAB-WELD* Plate Resistors

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Production AND Engineering
NEWS AT A GLANCE

"WORM'S EYE" INSPECTION— On-the-line inspection employed in Hotpoint's Chicago electric range finishing plant combines both visual and electric thickness gage checking. On the body inspection line, a mirror mounted at an angle on the floor enables the inspector to see the "toe plate" at the bottom edge of the range body. All front door panels are color matched, both visually and with the photo-electric reflectance reading equipment. Thickness of enamel coatings is checked with an electric thickness gage both before and after firing. If, during this process, parts are detected to be over 18 thousandths in titanium enamel and over 25 thousandths in zirconium enamel they are rejected.

FAST CLEANING ACTION— Besides faster cleaning, a new copper shot developed by American Wheelabrator & Equipment Corp., Mishawaka, Ind., for blast cleaning and finishing nonferrous parts, imparts a lustrous, brilliant, almost burnished finish of natural color to the work. Made from pure copper ingot with only a small amount of copper phosphorous deoxidizer added to insure soundness, the shot provides practically no plating effect of the copper on the work. Aluminum castings, for example, retain an aluminum color with only a slight, if any, orange tinge.

TO HANDLE LONGER BILLETS— New heating furnace slated for the skelp mill of the new Indiana Harbor tube mill of Youngstown Sheet & Tube Co., currently being equipped, is designed to accommodate 35-foot billets, and will have a capacity of about 80 tons per hour compared to 30 tons for the present furnace. Charging end is to be completely mechanized with new equipment for handling the longer and heavier billets. Thirteen roll stands are to be included in the mill proper to permit it to produce skelp from thicker billets. Processing of longer coils will reduce the number of end-welds and minimize hand labor.

MATTER OF GRIT SIZE— When plunge grinding on a centerless grinder, surface finishes of low microinch rating may be obtained by using medium-fine grit wheels. Besides providing the desired finishes, according to *Grits and Grinds*, such wheels also allow stock to be removed more quickly, reducing unit grinding cost proportionately. When fine grit wheels are used, it is pointed out, the cutting action of the wheel is very slow. This lengthens the grinding cycle and raises the cost per piece.

ROOM FOR ORIGINAL WORK— Electrodeposition offers a way of making alloys which cannot be conveniently prepared by simply melting together necessary components, Harold J. Read, associate professor of metallurgy, Pennsylvania State College, pointed out recently. He indicated that two-phase copper-rich alloys of copper and cadmium show promise as bearing alloys, particularly with respect to fatigue resistance and compressive strength. But they are not industrially usable because of manufacturing difficulties associated with the fact vapor pressure of cadmium is very high at the melting point of the alloys. Since it is entirely feasible to codeposit these metals, it would appear that important results should be forthcoming from an investigation along these lines.

USED BY THE TON—Installation of the furnace bottom in Weirton Steel's 550-ton giant open hearth, which recently went into action, required the use of 178 tons of magnesia refractory. It was a 57-hour project in which materials handling played a leading role. The refractory was mixed with water in concrete mixers and carried into the furnace by a bulk conveyor. Seven pneumatic rammers, operating under 75 pounds per square inch air presure, were kept in continuous action. (p. 56)

FAST ACTION—A single press that performs seven operations on about 7000 pieces per 8-hour day is employed in turning out rear lamp bodies for Ford cars. In the operation, blanks for the bodies are stacked for delivery to the press. The latter which is equipped with seven individual dies set side by side operates in a progressive manner. It makes use of transfer bars that move each part from cavity to cavity until it is ejected after the seventh operation. Blanks are magazine fed. (p. 60)

THE "LOOP" FACTOR—In designing a jig or fixture for a welding job, the designer must keep certain fundamentals in mind. At the outset, all magnetic materials must be kept out of the loop which, in a spot welder, is the gap surrounded by the upper and lower arm, electrodes and base of the machine housing the transformer. (p. 62)

"TAILOR-MADE" ORES — Concentration is becoming more and more important, it is pointed out, as high-grade ores of the Mesabi are exhausted. But this does not mean that cost of producing iron and steel will necessarily increase because of the higher costs of producing the ore. Recent tests in smelting high-grade, agglomerated, magnetic taconite indicated a much lower coke consumption in the blast furnace and a much higher production rate of metal than with standard ores. Processed ores really are "tailor-made" for subsequent smelting operations. While it may cost more to process and prepare the ore, savings that can be realized in transportation and smelting can actually provide cheaper metal in some instances than from ores that are high-grade as mined. (p. 78)

Furnace Bottom

INSTALLED I

...In World's Lar

OPEN-HEARTH refractories are not merely an accessory to the furnace. They themselves are the furnace, to all intents and purposes. Actually, the steel work of the main structure can be called a frame which helps support the refractories, since the production of steel would be impossible without materials capable of resisting temperatures of close to 3000° F.

The largest furnace in the world, Weirton Steel's 550-ton capacity giant, which recently went into operation, took over 4 months to build, and an equivalent period for planning. But the bottom, which is by far the most important single part of the furnace, was completed in a record time of 57 hours.

This unit is a composite of the best features of open-hearth furnaces across the country. By installing a Ramset hearth, Basic Refractories Inc. of Cleveland completed the operation in record time.

Idea of ramming a bottom is almost as old as the basic open-hearth furnace itself. For many years individual operators made and used their own refractory ramming and plastic mixtures with varying success.

Interest of steel operators in this development has always been high, because they anticipated the many benefits to be gained, such as: 1. Ease of installation—relatively unskilled labor could install rammed hearths or repairs, releasing valuable furnace men for actual steelmaking. 2. Control of installation—the exact contour desired for the finished hearth could be obtained with greatest accuracy. 3. Uniformity of installation—no slag or other nonrefractory diluting agent would be required. As a consequence the hearth would have a uniformly high periclase (crystalline magnesia) content. 4. Economy of installation—the time required to install a rammed hearth would be far less than required to "burn in" a hearth of granular magnesia refractory, less fuel would be consumed and the shortened period required for "burning" the rammed hearth would reduce damage to roof, sidewall and other refractories, and hold nonproductive labors to a minimum.

Obstacles Encountered—On the other hand, there were formidable obstacles which discouraged most basic refractory manufacturers from undertaking the development of a practical commercial mix. Among the more serious problems were these: 1. Hydration—known magnesia clinkers were susceptible to the destructive effect of hydration. 2. Strength—chemical bonds were required which would not migrate or radically lower refractoriness, but would impart adequate strength to the refractory structure at all temperatures up to those at which a ceramic bond was developed. 3. Density—the magnesia clinker should have a high density and be sized so to yield, on installation, a structure of high density. 4. Workability—careful control of sizing would insure good ramming qualities, but to impart controlled plastic qualities to magnesia clinker which has a harsh nonplastic nature posed a different problem.

In 1939, we introduced to the American steel industry the original commercial magnesia ramming refractory. Ramix, as this cold ramming refractory was called, met with instant success. It incorporated in large measure the characteristics essential to a successful ramming mix and amply confirmed the benefits steelmakers had projected for a magnesia ramming mix. Over a period of eight years, its value was proved in more than 300 basic open hearths and in a like number of electric furnace bottoms. A program of further research resulted in the introduction of Ramset, an improved version.

Water Activates Chemical Bond—A stable, scientifically sized magnesia clinker designed to resist hydration together with chemical bonds is used in the manufacture of this refractory material. It is prepared for installation in the furnace by addition of water which activates the chemical bonds. By varying, within prescribed limits, the water addition, it can be tempered to yield a mix which will compact readily to a dense, monolithic mass under the impact of air hammers or can be used as a plastic mass for hot major repairs and to pipe or line tapholes.

Chemical bonds cement the refractory grains together at room temperatures and retain their adhesive action up to the temperature at which components of the clinker itself soften and sinter the grains.

One hundred and seventy-eight tons of this magnesia refractory were used on the Weirton furnace to form a layer nearly 13 inches thick on the bottom at the taphole and 15 inches thick on the ends. The refractory was mixed with water in concrete mixers and carried into the furnace by a bulk conveyor. Seven pneumatic rammers were in constant operation.

Finished bottom measurements were 18 by 58 feet at sill level, 14 by 52 feet, 4 inches at the base of the banks. Bath depth at tap hole is 45 inches.

Bottom Condition Satisfactory—Crews started ramming the bottom on Sept. 3 at 1:40 p.m. and com-

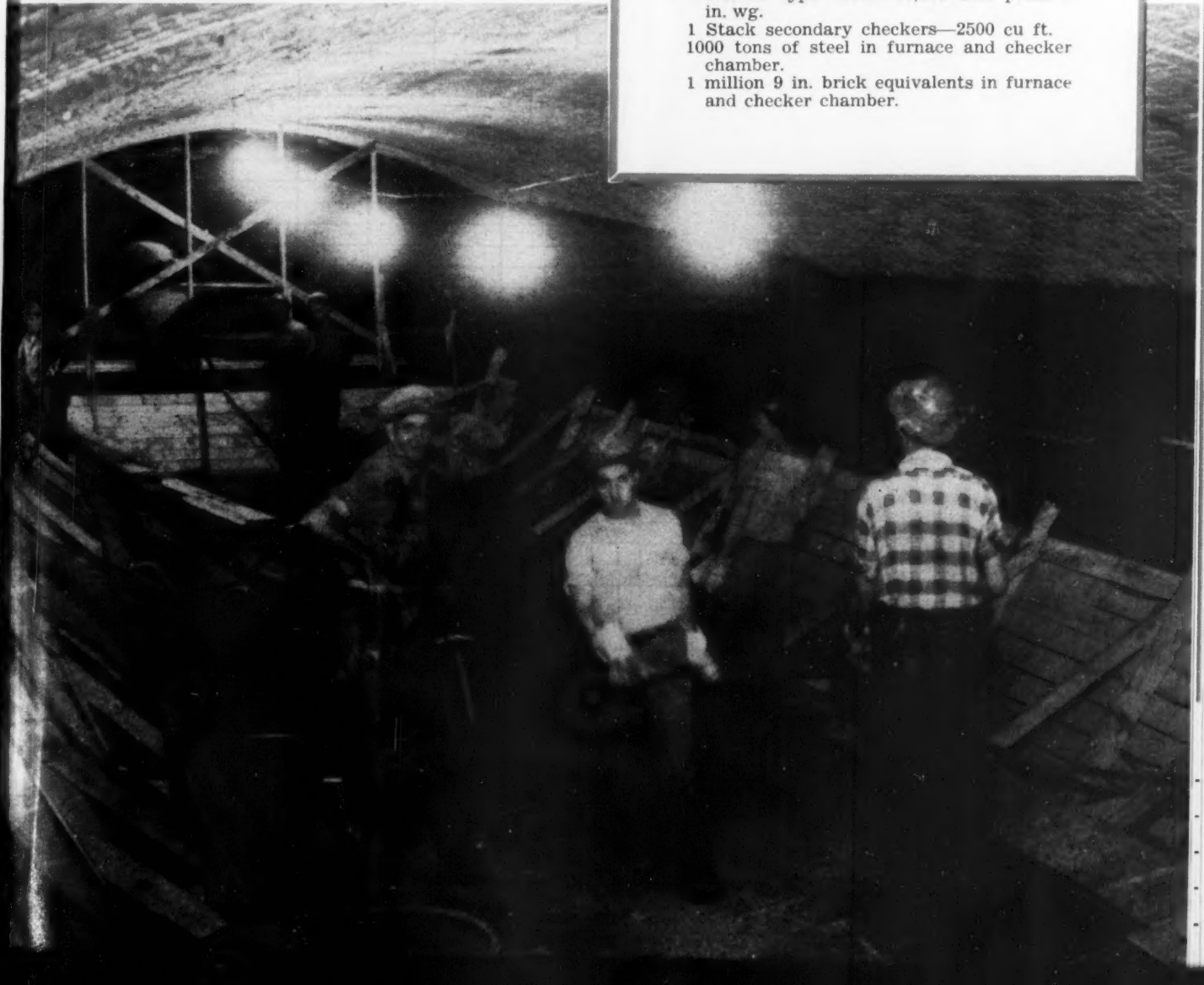
By H. N. BARRETT
Basic Refractories Inc.
Cleveland

DIN 57 HOURS

rld's Largest Open-Hearth

Point of controversy within the industry today is between the full rammed hearth or the subhearth with a "burned in" top layer. There can be no deciding this issue in a month or two. As each process receives its test of time, the better will rise to diminish the other

Fig. 1—Installing bottom in world's largest open-hearth furnace. Ramming the bottom refractory with pneumatic rammers has shortened installation time from more than 3 weeks to less than 3 days



Weirton Open Hearth Furnace Data

Furnace Proper

Bath size—58 ft long by 18 ft 6 in. wide by 3 ft 9 in. deep.
Overall dimensions—96 ft 6 in. long by 29 ft 3 in. center—24 ft 6 in. ends—height floor to top—15 ft.
Span at center—24 ft 9 in.—3 ft rise.
Slope of back wall—45 degrees.
Doors—7—4 ft 10 in. by 4 ft 7 in.
Port ends are basic brick construction.
Slag pockets are basic—23 ft 8 in. long by 19 ft wide by 13 ft 3 in. high.
Fuel—oil and tar.
Tapping—2—280 ton ladles—2—400 cu ft cinder pots.

Checker Chambers

Volume of checkers—11,300 cu ft each.
Checker brick—12 by 6 by 4 in.—8 x 8-in. opening.
Flue opening—130 sq ft each.
Chamber opening—75 sq ft each.
Flat suspended roof.

Isley Control

2 Stacks—80 ft high by 7 ft 3½ in. diameter.
1 Combustion air fan—40 hp—1200 rpm—No. 8½ type—SL—30,000 cfm press 2 in. wg.
1 Ejecting air fan—100 hp—1200 rpm—No. 10 type—SCL—30,000 cfm press 2 in. wg.
1 Stack secondary checkers—2500 cu ft.
1000 tons of steel in furnace and checker chamber.
1 million 9 in. brick equivalents in furnace and checker chamber.

pleted the job Sept. 5 at 10:50 p.m. The following day, 12 cars of railroad ties were fired to dry out the furnace. On Sept. 8, the oil burners were lighted and the furnace heated to approximately 2950° F in order to "burn in" the bottom. The first heat was tapped at 11:25 a.m. Sept. 9, and condition of the bottom was reported as satisfactory.

The first charge contained 2000 pounds of cold metal, 696,000 pounds of blown metal, 300,600 pounds of cold scrap, 10,000 pounds of ore and 44,600 pounds of limestone. A total weight of 1,009,444 pounds was charged and 915,735 pounds of steel tapped.

Raw steel produced by this giant furnace in one heat is equal in weight to the total amount of steel contained in more than 400 automobiles.

A trend toward complete rammed bottoms or subhearths is apparent from our production records which show that since 1940 we have installed rammed bottoms in approximately one-third of the furnaces in the United States. Of the 307 hearths we installed since 1940, only 14 were "burned in," a method which took up to three weeks to complete. During the war years of 1943 and 1944 when steel was top priority, we installed 97 bottoms, 70 of which were complete rammed bottoms, while 20 were rammed subhearths.

It was first thought that this movement toward the rammed bottom or subhearth was a temporary measure brought about by the period of high production during the war. But as is evident by our installation of 38 full rammed hearths and 57 subhearths in the period of 1945 to 1948 as against only 4 "burned in" jobs, the rammer bottom has matured.

Fig. 2 (right) — Record and log of bottom installation for new Weirton open-hearth furnace

Installation Supervised by:
D. Bedell Baxter
George W. Edwards

BASIC REFRACTORIES, INC. O.H.FURNACE #1

RECORD AND LOG OF CONSTRUCTION OF BOTTOM: WEIRTON STEEL COMPANY, WEIRTON, W.VA.

DATE	ADDITIONS TO BOTTOM		MATERIALS USED				FURNACE TEMPERATURE	CORE ANALYSIS SAMPLE ONLY	REMARKS: APPEARANCE OF CORE, ACTION OF ADDITION, SPEED, DENSITY, DELAYS, ETC.
	TIME STARTED	TIME FINISHED	BASIFRIT	HAMSET	MAGNESITE	SLAG			
1949									
9-3	1:40 PM				Mix 3 qts. water per sack				Installation of complete Hamset
					mixed in 4 and 6-sack batches.				Hearth. 7 Air Hammers and
						Finished Bottom Measurements			concrete mixer used.
						13' 2" x 52' at sill level.			Hamset placed in furnace by
						14' x 50' 4" at base of			means of conveyer. Complete
							banks.		set of forms used. Photographs
						46" Bath Depth at tap hole.			taken.
						11' 6" Center of roof to			
							bottom.		Hamset 13½" at Tap Hole
						6' 3" Bridge Wall to Roof.			Hamset 15½" Ends.
									8" Slope from Front Corners
					Estimate for Bottom Figured from Weirton				to Tap Hole
					Drawing #A0630.				6" Slope from Base of Front Bank
									to Tap Hole
									6" Tap Hole Pipe
									Front Bank 10" at Sill Level
									Front Bank 18" at Base
									Back Bank 22" at Sill Level
									due to Back Wall Slope
									Back Bank 10" at Base
									End Banks 12" at Sill Level
									End Banks 18" at Base
									12" Hamset on Back Wall taken up
									to Skew Back
9-5		10:40 PM		178 Tons					Flat divided into 5 equal sections
9-6	3:25 PM			8 Cars of R.R. Ties used Heating Up					Wood Fires Lighted.
9-8	9:30 AM								Oil on Furnace
9-11	8:45 AM	10:00 AM		3000#					Fill Shrinkage Cracks
"	11:00 AM								Began Slagging Bottom
"		2:00 PM				15,000 6 Small Charging Pans			Finished Slagging Bottom
"	4:15 PM								(Tap Slag (10,00# estimated (Drain O.K.
"	4:40 PM								Oil off to Chill Bottom
"	6:00 PM								Oil on Furnace
"	7:30 PM			1000#					Dust Shrinkage Cracks
"	8:15 PM								Oil Off Furnace
"	8:30 PM	9:00 PM							3000# Raw Dolomite on Flat
"	9:15 PM								Began Charging First Heat
"	9:30 PM								Oil on Furnace
9-12	11:25 AM								Tap First Heat
									Condition - O.K.
"	12:30 PM								Began Charging Second Heat
9-13	12:30 AM								Tapped Second Heat
									Condition - O.K.
9-14	1:40 AM								Began Charging Third Heat

Fig. 3 (above) — View of unused rammed bottom taken from taphole of 60-ton furnace that was installed in Illinois. Photo shows little effect hydration had on the installation. When this furnace was dismantled, the bottom was removed with air hammers about as quickly as it was installed

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SEEN AND HEARD IN THE Machinery Field

By GUY HUBBARD
Machine Tool Editor

MACHINE TOOL CO-OPERATION: An interesting example of how two machine tool companies—each of which has developed a specialty—can bring together those specialties in the form of a machine tool of advanced design, is given by Bullard Co. of Bridgeport, and Cincinnati Bickford Tool Co. of Cincinnati.

In connection with its constant effort to cut costs and to improve accuracy in its own shop, Bullard developed a two-way semiautomatic "spacing table." By giving step-by-step, accurate, predetermined spacing, this Man-Au-Trol unit—when mounted under the spindle of a drilling machine—enables the drilling, reaming and tapping of a large number of holes to "jig accuracy" without jigs and without measurements by the operator. Thus repetitive work, even in small lots, can be accomplished without running up special tool costs and without requiring highly skilled operators.

Bullard immediately saw commercial possibilities in this device and so also did Cincinnati Bickford, under the spindles of whose radial drills some of the most successful demonstrations were run. The result has been that Cincinnati Bickford has developed a new type of accurate and rigid "column and overarm" drilling machine, literally designed around the Bullard spacing table and designed to make use of the capabilities of that device to the highest possible degree.

This isn't the first time that a specialty made by one machine tool builder has been combined into the design of another machine tool builder. Precision spindles, for instance, frequently are so merged. However, the individual specialties in this Bullard-Cincinnati Bickford case each constitute a major contribution to the co-ordinated combination. In that respect the project is unique. It demonstrates that in this day and age of specialization, "two heads are better than one" in the thinking out of a master design. In all probability we are due to see more of this kind of machine tool co-operation.

DOWN AMONG THE GRASS ROOTS: Over many years that I have been attending meetings of the National Machine Tool Builders' Association, I have been hearing about ways-and-means for getting the truth about private enterprise and the traditional American way of life spread around "among the grass roots." As far as I can discover, many industrialists are counting on hiring this job done. Too many of them have an idea that the conditions down among the grass roots are not pleasant to anyone who is used to being at a higher level.

If the shop level is considered to be down among the grass roots of industry, then I spend considerable time among the grass roots. I always have and I hope to do so for a long time to come, because a vast amount of common sense and ingenuity and skill and loyalty can be found there. Furthermore, a vast amount of inside knowledge about company affairs circulates around among the grass roots. I could write quite an essay on how it gets there and how it is interpreted—but not at this time.

What I do want to emphasize is that it is not always necessary for someone on high to go down among the grass roots with a message. Many loyal workers down there already have these truths and they are doing their level best to transmit them to fellow workers. What they need from above is encouragement to do this in their own way. They don't need "canned" speeches.

One of the finest talks on value and satisfaction of good craftsmanship was delivered to me several months ago by a third generation German-American patternmaker in a big shop in Hamilton, O. He told me that he took every opportunity to deliver that message to young workmen with whom he comes in contact day-by-day.

One of the best talks that I ever heard on the advantages of America was delivered to me not long ago by a Polish-American toolmaker in Milwaukee. "America has been good to me," he said, "and I think it is good for America that I tell these things to many people." These are only two examples of the thousands of plain people who of their own free will are spreading plain truths down among the grass roots. They deserve more recognition and more encouragement from management.

HOW SMOOTH IS SMOOTH? At the recent meeting of American Society of Tool Engineers in Montreal, a session was devoted to fine surface finishes on metal and methods for measuring and comparing degrees of smoothness. Science has become deeply involved in evaluation of surface finish, but the fact remains that the generation of true metallic planes to a high degree of smoothness is an almost primitive process.

Given three castings, a chipping hammer and chisels, some files, red lead or Prussian blue in oil, a set of hand scrapers, and an unlimited patience, a skilled workman can produce accurate, highly finished surface plates in the depths of a wilderness.

One of the most important—and least appreciated—laws of nature, is that by patient chipping, filing and "scraping together" in rotation of three plates, true planes eventually can be generated. Whitworth claimed he discovered this principle, but Nasmyth stated that Maudslay was doing it long before Whitworth's time. I strongly suspect that this basic principle of machine tool building actually was known to prehistoric workers of stone. If so, history repeats itself. We now have stone surface plates.

Fig. 1 — Blank and stampings for Ford tail lamp bodies as they appear after five of the six drawing, piercing and trimming operations

By FRANK W. GAWRONSKI
Flat Rock Plant Manager
Parts & Equipment Mfg. Div.
Ford Motor Co.
Flat Rock, Mich.

HOW FORD STAMPS LAMP PARTS

High output is maintained on press setups using progressive and single-cavity dies. A single press performs seven operations on about 7000 pieces in an 8-hour day

REAR (or license plate) and parking lamps may be classed as minor accessories of the modern car but their efficient production is just as important as that of scores of other components. Such production, for Ford cars, is assigned to the Flat Rock, Mich., plant of Ford Motor Co. parts and equipment manufacturing division and is carried out on a large scale with efficient tooling.

Blanks for rear lamp bodies and for parking lamp bodies are stamped out at a high rate in a 645 Bliss high speed blanker, Fig. 3. This is fed with 21-gage steel of 6-inch width from coils. Flash is cut up for scrap and drops into tote boxes while the blanks feed down a chute into another box.

Seven Dies—In the case of rear lamp bodies, the blanks are stacked for delivery to a 92½ H Toledo press, Fig. 2, equipped with seven individual dies set side by side. These constitute in effect a single progressive die. Transfer bars move the part from cavity to cavity until it is ejected after the seventh operation. Blanks are fed automatically from the magazine at one side and, except for watching the setup to see that it functions as required, the operator need only keep the magazine supplied with blanks.

Drawing is done in the first die and the flange is trimmed in the second die, the flash being cut for ejection back of the press. Third die straightens the flange and stamps letters thereon. Operations classed as "curling" are done with dies operated by

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cams and springs at each of the next three stations, portions of the flange being turned inward. In the final station, two holes are perforated, that at top center being extruded upward. After this operation, the transfer bars lift the piece free of the last die and it slides down a chute when the bars separate. This single press thus performs seven operations on about 7000 pieces per 8-hour day.

Tail lamp bodies are produced from blanks of the shape shown at the left of Fig. 1, which also shows the piece after five of the six remaining operations. The initial draw is made in a No. 247 Hamilton press, and is followed by a second draw in a No. 203 Bliss press and a third draw in a duplicate press. A restrike operation follows in a DG 54 Ferracute press, and then two side impressions are drawn in the No. 203 Bliss press. Finally, the flange is trimmed and three holes are pierced through it besides three other holes that are pierced, one in the center of each drawn impression. This final operation is in another DG 54 Ferracute press. Production on this line of presses is about 675 pieces per hour.

Single-Impression Dies—These two stampings are good examples of two types of production. The first uses, except for blanking, a set of dies (constituting, in effect, a single progressive die) in a single large press equipped with magazine feed and transfer bars. This press requires only one operator. In the other type of production, a group of much smaller presses, each with its own single-impression die and its own operator, does the same job, one step at a time.

Although the second type of production requires more labor and more presses, it is better adapted to certain types of work. Also, the presses can be set up quickly for other jobs where a single large press with transfer arrangements, though convertible to other work, is less flexible, since the jobs to which it is adapted are fewer in number.

Parking lamp doors are among parts produced in this plant from 21-gage brass which, besides being quite resistant to corrosion and free from red rusting (such as may occur on steel) is easy to work, easy on dies and is readily plated without the copper undercoating needed on steel parts that are subjected to severe exposure conditions.

Blanks for parking lamp doors of the shape here considered are drawn from blanks that are roughly elliptical and make one right and one left door. Drawing is done in a double-acting Bliss press, and pinch trimming and lug blanking are performed in a second die. Then in a third die, a window opening is cut in each half and the stamping is cut in two.

Placed in Cam Die—Next, each door is placed in a cam die. This die forms a flange around the window opening and also pierces two screw holes at odd angles. About 700 pieces per hour are handled through this die. Forming of each window is completed in horn dies, one right and one left, that form ears previously blanked. This makes the doors ready for buffing which is done in a straight line Robinson machine. This machine includes a series of carriers that, after loading, are traversed under a group of six wheels set at suitable angles to buff given areas.

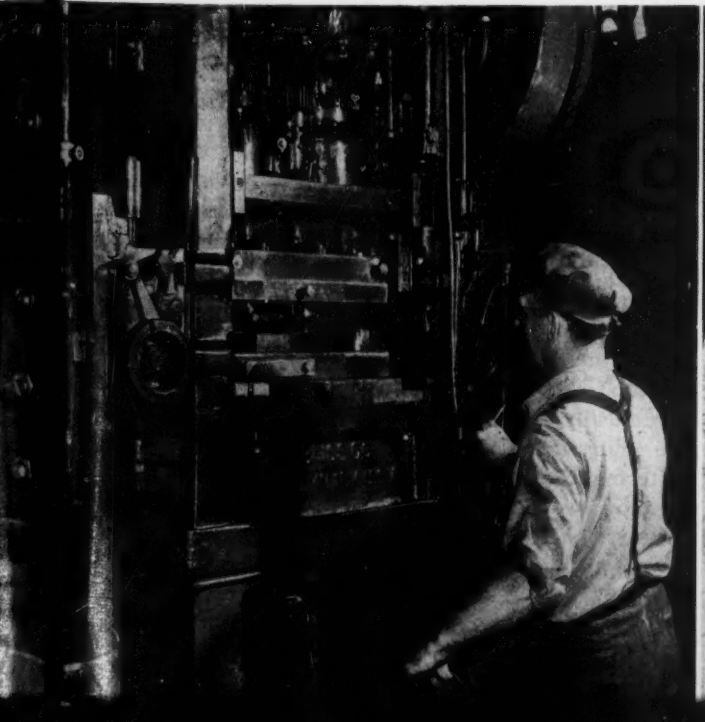
Near the center of this machine, the carriers are rocked automatically to a new position and then pass under another group of six wheels set to buff remaining areas on which bright plating is required. Carriers then return below the bed to the unloading and reloading station where the operator takes off buffed stampings and applies new ones to be buffed.

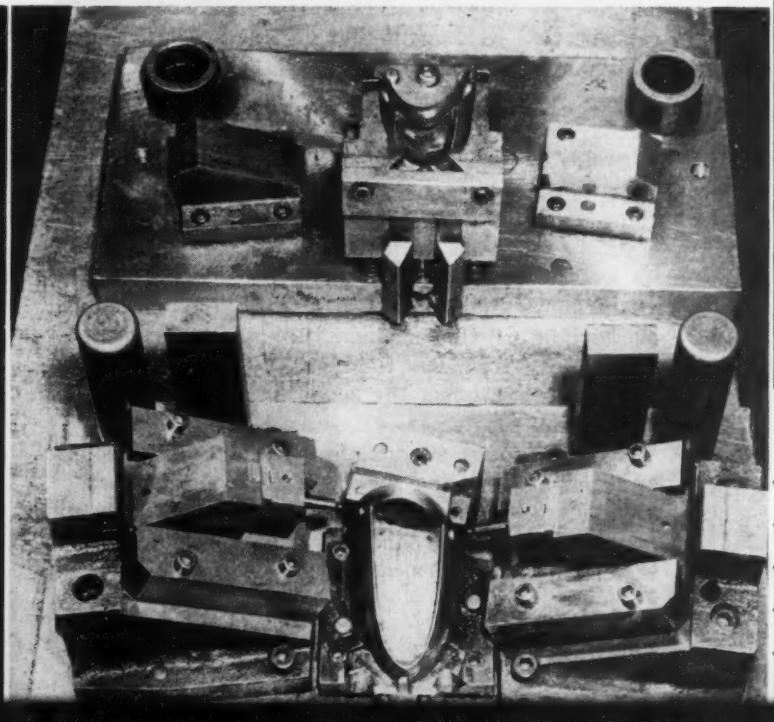
Upon leaving this machine, the doors go to a wheel where hand coloring is done. This readies doors for nickel and chrome plating.

Fig. 2 (left)—Toledo press equipped with a series of seven dies, a magazine for feeding blanks and transfer bars for automatic shifting of the rear lamp body stampings from station to station

Fig. 3 (center)—Blanks for rear lamp bodies and other stampings are produced rapidly in this high-speed Bliss press, using coiled strip stock. Flash, cut into two pieces, falls into a tote box

Fig. 4 (below)—Punch (top) and cam die in which the hole in a parking light door are pierced and a flange is formed around the window opening





Correctly Designed Jigs and Fixtures Can CUT WELDING

Each welding job has its own characteristics and its own problems. How effectively jigs and fixtures can facilitate production, increase accuracy and decrease costs on any welding application, depends upon the correctness of their design

MAXIMUM results are achieved from resistance welding when metal products are designed to take full advantage of welding possibilities. Similarly, the effectiveness of jigs and fixtures is almost wholly dependent upon their correct design, bearing constantly in mind that jigs and fixtures are employed to increase production accuracy and production volume—with cost-cutting as a principal objective.

Before a fixture or a jig can be designed for a job, the best possible method of welding the parts must be determined. An operation being done by repeated single spot welding may, by a simple change in the parts be performed by the projection welding method where all spots to be welded on the parts can be welded by one stroke of the machine, making for higher production and a much better looking finished article. By changing from the slow butt weld to the flash-butt weld, less finishing may be required, or a short seam weld on a difficult shape by the use of a mandrel and roller electrode may replace several spot welding operations, using a number of different shaped electrodes. It is always best to try various methods of welding the parts before a costly jig or fixture is designed and built. The machine available must be suitable for the stock to be welded in kilovolt-ampere capacity and welding pressure. The speed of the operation must also be considered.

Data Available — Welding data are available for thickness of stock or number of projections that can be welded by the various methods according to size and capacity of each machine. However, if the machine available is to be speeded up for a faster operation than that for which it was originally built, its kva rating must accordingly be increased, or the maintenance of the welder, due to the consequent overloading of the machine through replacement of parts and particularly the electrical portions thereof, will more than offset the supposed savings for faster operation through jigs or fixtures.

Correct use of such materials as tungsten-copper or its equivalent, the several grades of alloy copper, aluminum bronze, aluminum and aluminum alloys and nonmagnetic cast iron, also insulation materials in their different grades, and methods of insulating for protection from electrical current primarily, but also to resist flash particles thrown off the stock when welding, water, dirt, and handling protection cannot be fully described here. These data are available and the designer should be familiar with these materials and use them in their proper places.

Aluminum bronze, or its equivalent, is used for fixture bases, arms, clamping devices, stops and such parts of a jig or fixture close to or part of an electrical conductor where greater strength or wear is necessary than could be obtained if brass or copper or other nonferrous, nonmagnetic materials were used. Aluminum and its alloys can be used extensively in jigs where a minimum of weight is necessary. However, aluminum should not be used for actual current-carrying parts because oxidation will develop eventually and sometimes cause serious trouble.

Nonmagnetic Cast Iron—Nonmagnetic cast iron is used frequently for parts of a jig or fixture close to or in the magnetic field of the welder. It is cheaper than aluminum or bronze and slightly stronger than ordinary cast iron. Fixture bases, frames and machine arms are frequently made of this material sometimes known as "nickel iron."

Copper is mentioned last because it is most frequently used as a basis for welding jigs and fixtures. It occupies as important a place for welding machine jigs and fixtures as iron and steel do for other machine tool operations. Rolled copper in flats and rounds, cast copper and hammered or forged copper are indispensable. Copper, stainless or high-strength annealed steel tubing cast into copper castings should be used wherever possible for water cooling inasmuch as drilled holes in copper castings usually permit leakage of water that is very difficult to stop.

Frequently, it is necessary to alter the welding machine in some way to adapt a jig or fixture for the method of welding desired. Motor-driven, air- or hydraulically-operated press type welders can readily be changed to do projection or spot welding by simply altering the electrodes. It is essential that all projection welding electrodes be located directly on sturdy construction to avoid deflection.

Fundamentals Considered—In designing the jig or

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fixture best suited for an individual job, the designer must keep certain fundamentals before him. At the outset, all magnetic materials must be kept out of the loop which, in a spot welder, is the gap surrounded by the upper and lower arm, the electrodes and the base of the machine housing the transformer. This gap is an intense magnetic field and any iron or steel placed in it will become hot and in some cases actually melt. Furthermore, the presence of iron or steel in the "loop" chokes the available welding current making for poor efficiency of the welder.

In the matter of welding electrodes, the designer should make them easily and quickly replaceable and water cool them as close to the tip as possible. The inlet water tube should not be less than 3/16 to 3/8-inch ID, depending on the job.

Incidentally, it is surprising how often the matter of proper water cooling is neglected—an oversight which makes itself known through overheating, excessive wear, transformer burnouts and the like. On a high production job where electrodes are welding with each stroke of the machine, running continuously, an individual and separate water-cooling line should be provided for each electrode. Provision should be made for a sight drain pot and it should be inspected frequently to insure a flow of cool water. Regulation valves should be provided to adjust this water flow to prevent waste.

Welding under water has been found a decided advantage in seam or line welding of small diameters where sufficient water cooling could not be provided in the lower arm because of work clearance. In the dial feeds for projection welding, this method has simplified the water circuits considerably.

Electrode Wear—The designer must also make the necessary provisions for electrode wear. Not only must adjustment of electrodes be provided to maintain a constant welding pressure on the work at all times, but stops, gage points, pins, etc., must also compensate or be of a large enough surface to gage the work at both the new and worn-out electrode height.

Another design caution to be observed is the provision of sufficient cross-section to current-carrying members, run as close to the electrodes as possible and with as few breaks or connections in the circuit as possible. A welding current, of course, is extremely high in ampere capacity and carries from 3 to 20 v, depending on the machine and on the job—and a pure copper conductor can carry only a limited current depending on its mater and cross-section. For purposes of estimating cross-sections the following cur-

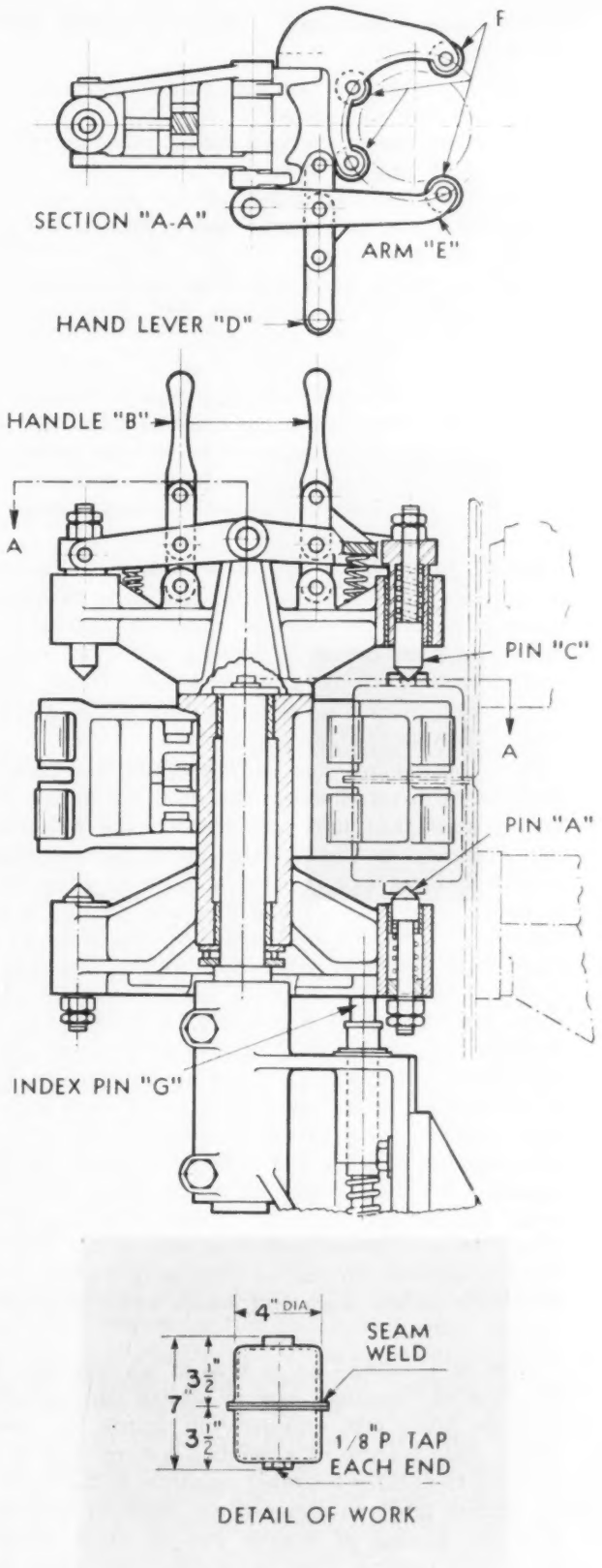


Fig. 1—Two-station seam welding fixture for welding two halves of a container. Key is explained in text

rent densities, based upon a 50 per cent duty cycle, are recommended:

(a) Rolled copper sections should carry up to 1800 amp per sq in.

(b) Cast copper sections should carry up to 1500 amp per sq in.

(c) Water cooling either of the above will increase its capacity approximately 100 per cent.

(d) Low-duty cycle will allow more current to be carried per square inch of conductor than a high duty cycle.

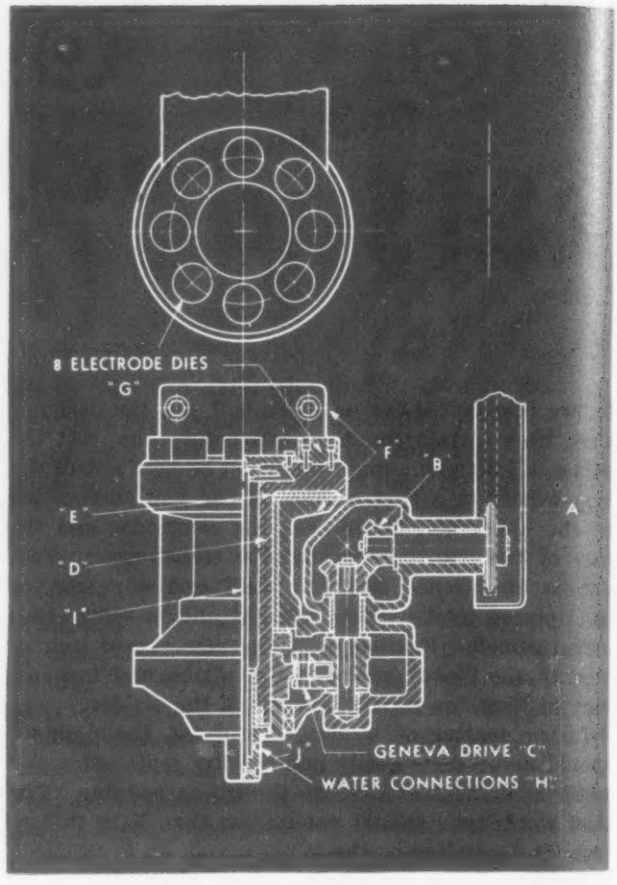
(e) Other nonferrous alloys can be used provided the section is large enough. Where breaks or connections must be made, the clamping surface must be at least twice the cross-section and the surfaces scraped smooth and parallel, and bolted solidly together.

This is particularly necessary on flash welders although on spot or projection welding some flashing is bound to occur and when as many as 2000 to 4000 welds are made per hour, flashing can cause considerable trouble by getting across insulated pins, causing a direct electrical short, or into slides, making repairs necessary.

Since the welding pressure application to a piece of work has a direct effect on the weld, the design of a fixture must take into consideration the following: (a) Accuracy in the machine work for projection welding fixtures and electrodes, and (b) elimination of deflection due to welding pressure, so that upper and lower electrodes are parallel to each other in all planes and remain so when final welding pressure is applied. When necessary to projection weld at a slight angle the projection should be elongated in the direction of the possible "slide" that occurs when "squeezing" for the weld. Flash welding clamps must be so designed as to clamp the piece of work with at least twice the final pushup pressure to prevent possible slippage of work and to insure a good electrical contact. Welding height or point where the electrode touches the work in "rocker arm" machines should be in a direct horizontal line to the fulcrum point of the arm, so that no slipping or wiping of the electrodes on the work will result when pressure is applied.

Ease of Loading—As is true of all jigs and fixtures for any machine, ease in loading and unloading must be taken into consideration during the design stage. One feature of a welding fixture that is not common to fixtures for other machines is that a welding fixture must be designed and built to accommodate the loading of usually two or more separate parts that become, after the welding operation, only one piece that must be unloaded. Care must be taken that a welding fixture or jig will unload properly when the parts are welded. Danger to the operator when loading and unloading fixtures and jigs, from the standpoint of electrical shock, is very remote provided there is no primary short in the machine.

Secondary current, or welding current, is of very

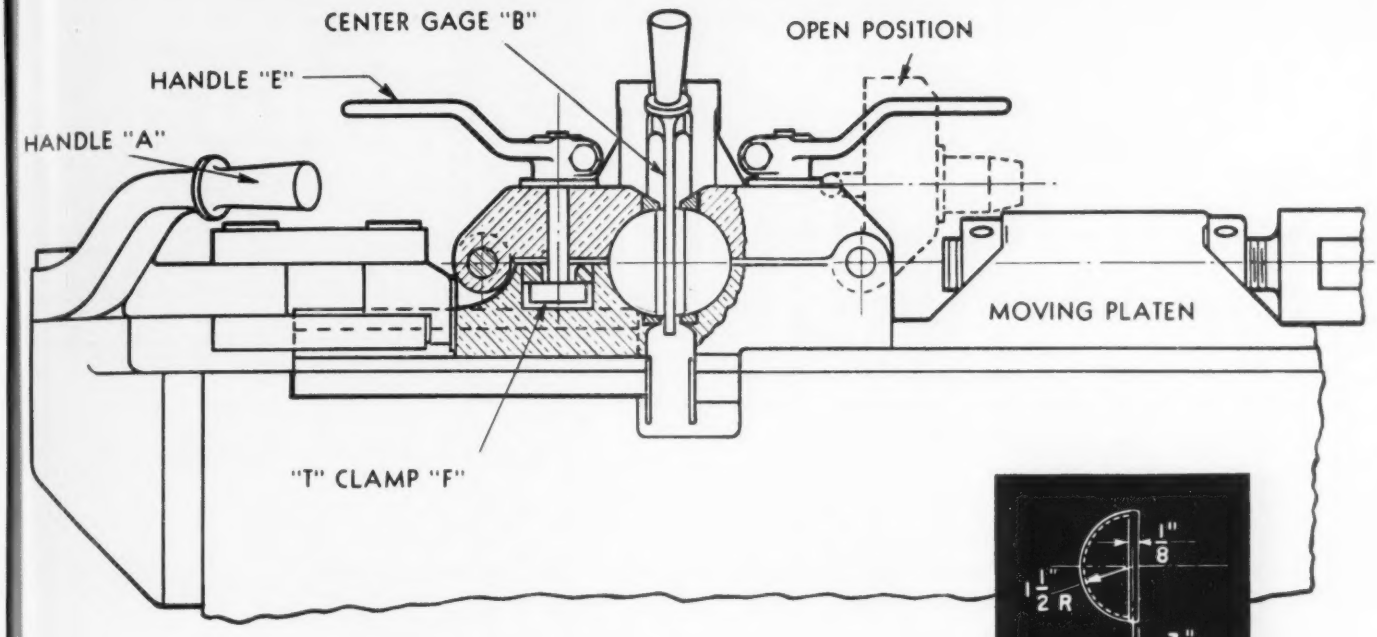


low voltage and is entirely safe even though the secondary circuit is unprotected. However, for the operator's protection, only one side of the secondary circuit—either above the top electrode arm or below the fixture base—should be insulated from the base of the machine. The welding machine should also be grounded so that, if a primary short develops in the transformer or controls, it will be positively grounded through the welding machine and not through the operator, as would be the case if both sides of the secondary circuit were insulated from the machine base and the operator were touching both upper and lower electrodes or electrode supports. Further protection for the operator's hands should be taken into consideration by providing guards on hand-loaded electrode dies. Use of two hand-operated control switches that must be pressed by the operator's two hands usually is a simple method of assuring absolute safety.

In a welding fixture or jig for heavy welding when the stock may not always be clean, there is a tendency for the work to stick to the electrode faces. This should be taken into consideration where progressive jigs are used, also when automatic or quick loading and unloading of the work is desired. Knockout pins, operated through a leverage advantage or by an air cylinder, or a positive stripper save considerable production time and add to the operator's protection.

Magnetic pull of a welding machine toward the transformer is frequently of such intensity as to lift small pieces of work out of their locators, and small eccentric clamps made of steel, when sufficiently close to the loop to be affected, are sometimes actually re-

Data and illustrations from Resistance Welding Institute, Cleveland.



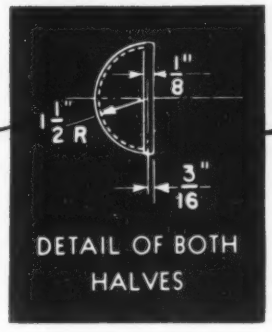


Fig. 2 (left)—Cross section through an eight-station dial. This assembly is mounted on front of a motor-driven spot or projection welder

Fig. 3 (above)—Flash-butt welding fixture for a 3-inch diameter spherical shell

leased by this force. Workholding plates and clamp handles of nonmagnetic material will prevent this condition.

Fig. 1 illustrates a two-station seam welding fixture for welding two halves of a container as shown in detail of the work. Lower half is loaded on pin A and upper half directly on top, with flanges together. Handle B is then raised and top pin C holds top half in place. Locating pins are spring mounted. Hand lever D then closes roller arm E to a definite stop and rollers F maintain concentricity of the two halves during the welding operation. Welding rolls and portions of the welding machine are shown in dotted lines. Entire fixture is mounted on a slide and with an adjusting screw can be raised or lowered to compensate for roller wear.

The two stations are rotated by hand and through a foot-operated index pin G, are located in a welding position. This foot treadle is also arranged so that it automatically starts the welding sequence when the index pin locates the station, the welding sequence being the lowering of the upper welding roll which is driven and which in turn revolves the work, completing the seam weld. The operator, then ready for indexing to opposite station, presses the foot treadle which breaks welding circuit and raises the upper roll. This fixture is for mounting on a standard circular seam welder.

A flash-butt welding fixture for a 3-inch diameter spherical shell is shown in Fig. 3. Detail of each half is shown. The usual standard hand-operated flash welder is used and the fixture consists of a left-hand die mounted on the usual stationary platen, a center gage for alignment of the two halves and moving platen die. Both dies are split and hinged completely open for loading and unloading.

After placing the two halves of the work in the dies, dies are swung shut but are not locked. Handle A then moves left hand die against center gage B, (straightening the toggle links) squaring up the work. Handle E is then turned 90 degrees and this half is locked through a T-clamp F. Moving platen is then moved against center gage B; when work in this die is squared up it is clamped.

Center gage is then raised and the two halves butt-welded together. Dies are then opened and work removed. In flash-butt or upset-butt welding the clamp assembly used incorporates the special fixture requirements. Flat, round or irregular shaped work can thus be located and clamped with clamp assemblies especially designed for this particular work.

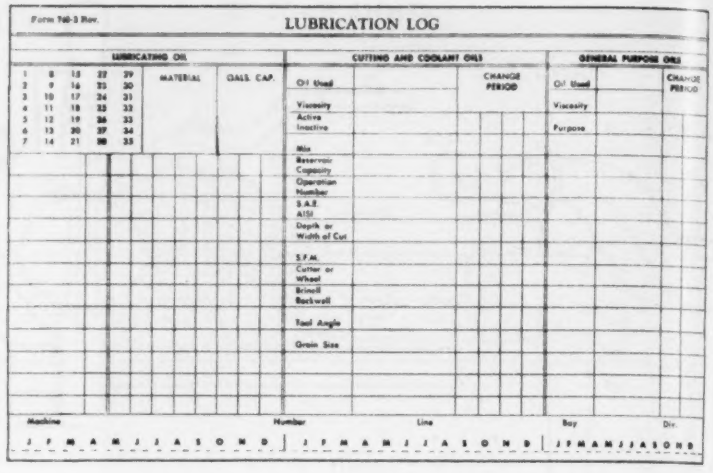
In Fig. 2 is illustrated a cross-section through an eight-station dial. This assembly is mounted on the front of a motor-driven spot or projection welder, and is driven by a shaft extension from the welder clutch box, through a roller chain drive to sprocket A, then through bevel gears B and Geneva drive C. Main spindle D is copper; commercial alloy copper is used for bushings and contact plates E. One contact plate is fastened to the revolving spindle and one to the lower support casting F, also made of copper, by flat head screws.

The lower electrodes or dies G are simple in construction, and wear space is provided. Water connection stuffing box H provides for water cooling through inlet I, through center tube, around inside of the dial and returns through outlet J. Bevel gears and Geneva drive are enclosed and run in oil.

LUBRICATION SERVICE SYSTEM

. . . pays off in less machine down time

Based successfully on the idea that lubrication failures can be eliminated if machines are lubricated with the correct lubricant, applied in proper quantity at the right time and in the right way, Tapco's established lubrication department could well serve as a pattern for other metalworking plants


LUBRICATION LOG

LUBRICATING OIL — MATERIAL — GALS. CAP.

CUTTING AND COOLANT OILS — Oil Used — Viscosity — Active — Inactive — Mix — Reservoir Capacity — Operation Number — S.A.E. AISI — Depth or Width of Cut — S.F.M. — Cutter or Wheel — Brinell Rockwell — Tool Angle — Grain Size — CHANGE PERIOD

GENERAL PURPOSE OILS — Oil Used — Viscosity — Purpose — CHANGE PERIOD

Machine — Number — Line — Bay — Div.

J F M A M J J A S O N D | J F M A M J J A S O N D | J F M A M J J A S O N D

By O. M. ALBL
Lubrication Engineer
Thompson Products Inc.
Cleveland

CORRECT lubricants are an integral part of any machine. No machine is complete unless lubricants are correctly applied in the proper places, in the required amounts and at the right time. On these premises, Thompson Products Inc., Cleveland, established its planned lubrication service. As a result of efficient functioning of the lubrication department, down time chargeable to this department is under 0.5 per cent on productive hours for over 7 years.

When the present lubrication department was founded, (STEEL, Aug. 9, 1943, p. 82) a lubrication engineer was appointed. He is also foreman of the group, responsible for the selection of oils, greases, recommendations, system, procedures and management of supervisors and lubrication service men. The foreman is subordinate to a general foreman who is also in charge of the machine repair department. This arrangement eliminates most of the "buck passing" between these departments since they both have the same department head.

A survey was taken to determine what oils were being used in each machine and/or equipment. It was found that at least 40 per cent of the oils in use could be and were eliminated. Samples of the remaining oils were sent to the laboratory for their inspection and approval. Then the official recommendations, for the time being, were made for each machine, with due consideration being given to the major oil suppilers' survey, machine manufacturer's recommendation, and our own past experience.

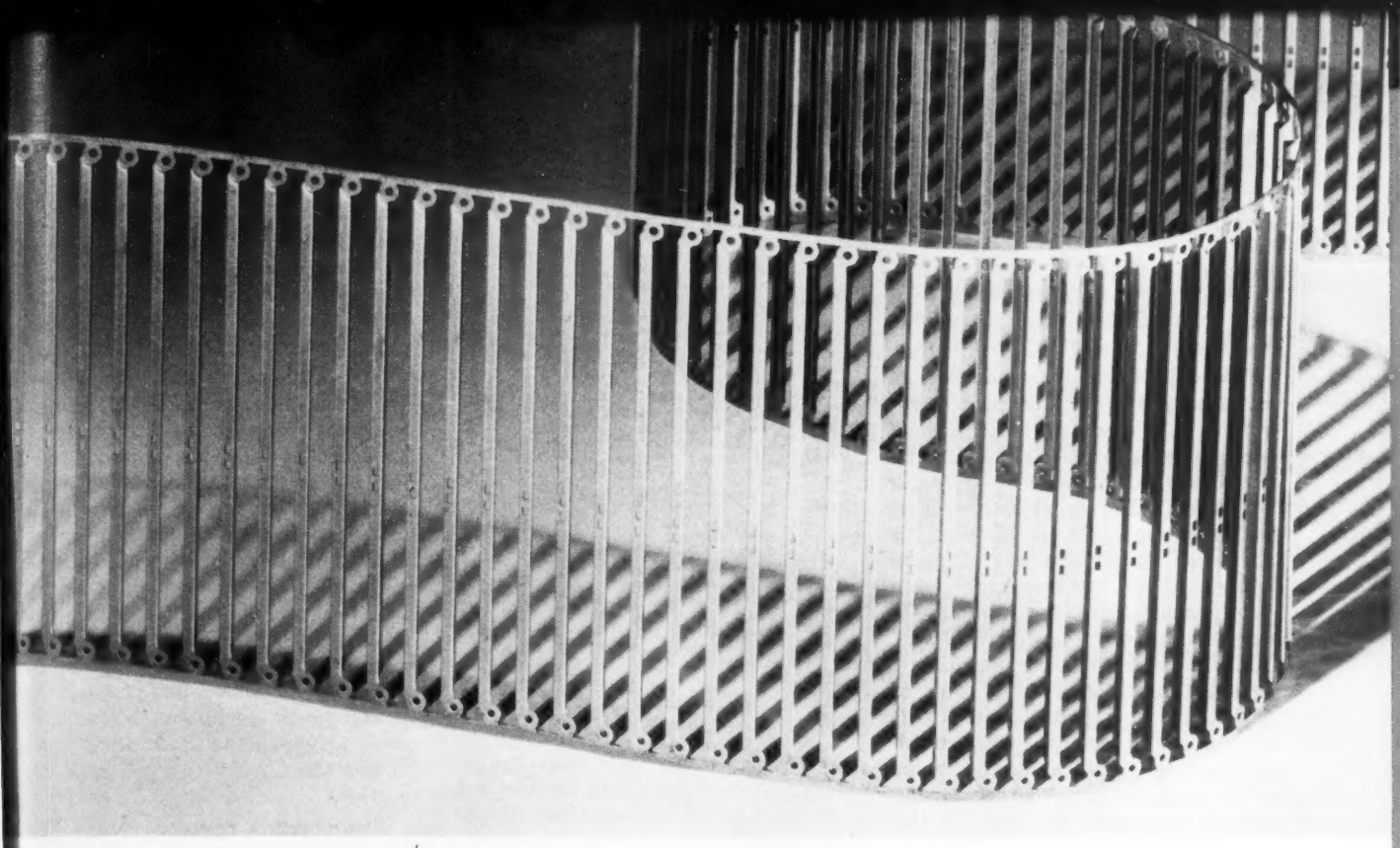
Changeover Complications—Considerable time was spent in making all the necessary changes that had to be made in order to conform to the recommendations, so each machine had the specified lubricant in all its various parts. Then began the long, tedious job of checking the recommendations. Samples of oils in actual use were taken at specified intervals, the amount of make-up oil that had to be added, and at what frequency it had to be added, was recorded. Temperature readings were taken at intervals, and finally the major supplier made a complete, before-and-after report of specifications, which were submitted to the chemical laboratory. The results were checked here.

This work continued for a period of from 6 to 9 months. Since machines were operating on a three-shift basis, it meant that testing covered a period from 18 to 27 months. Results of all this testing proved that the correct lubricants had been selected and were applied in the right places. This made it possible to set up a definite frequency for each category of lubrication. In setting up frequency changes, we made an allowance for a safety factor which proved, and is proving beneficial, since machines in most cases have been speeded up.

At intervals, further surveys were made by other suppliers and the same testing procedure followed. The result was that all but a few oils passed these tests with varying degrees of success. In testing lubricants, the following factors were taken into consideration: (1) Lubricants must perform satisfactorily in the service for which they are intended, with a minimum of friction and wear. (2) Quality and performance characteristics of each lubricant were evaluated and the oils selected to keep lubrication labor costs at a minimum and to insure minimum interference with production. (3) Lubricating oils for circulation or splash systems must be capable of being reclaimed without loss of service value.

Titles Changed—The names, "oiling department" and "oilers" are not used at Tapco. Instead we have a "lubrication department" and "lubrication service men." We believe this policy should be adopted more universally. This change in titles has resulted in attracting a higher type individual to the department, thereby making it possible to raise our standards. The cabinets, supervisors' desks, and partitions of the main lubrication station are painted white. This feature also had its effect, resulting in neater and more efficient work. Each man is assigned a drawer at the main station where he can keep his personal tools. He is provided with a grease gun, oil cans, tallow pots, etc. This policy has reduced the replacement costs considerably. Records show that one man used the same oil can and grease gun for over 5 years by keeping them repaired at all times. When the same equipment was used by all three shifts no one was particularly interested in keeping it in first-class condition. Good tools and equipment have further raised lubrication standards.

Total number of machines and equipment is divided into equal sections and a lubrication service man is



14½% more units per die grind

accurate material. By actual count, THINSTEEL "yielded" 6000 more parts per ton.

But THINSTEEL'S close gauge accuracy doesn't stop at cutting material costs. It also pays off in lower tool costs. To quote again from our customer's letter:

"The figures show us that we got 14½% more units per grind from the same quantity and same shipment of steel as we listed in the above instance as against the same shipment from another mill."

In addition, machine shutdowns for coil replacement were reduced in number because CMP THINSTEEL comes in extra-long coils.

Whatever grade or size of flat-rolled steel you are using, THINSTEEL offers equal opportunities for cost reduction. A CMP representative will gladly call to help you figure just how much you can save.

*Name on request.

COST SAVING ADVANTAGES OF THINSTEEL

Wide Range of Tempers and Analyses in Carbon, Alloy and Stainless Grades.	The analysis and physical properties best-suited to your fabricating processes and to the application requirements.
Close Gauge Tolerances.	More parts per ton. An average oversize gauge variation of .002" on .030" strip means 6⅔% fewer parts per ton. Less strain and wear on dies.
Extra-Long Coils.	Fewer machine shutdowns for coil replacement. Fractional-inch widths can be oscillated-wound in coils containing several times the footage of ordinary coils.
Gauges Thin as .001".	Lighter gauges with properly-developed physical properties can be used to replace heavier material, reducing weight without sacrificing strength or utility, cutting shipping costs all around.
Any finish — dull to mirror-bright or electro zinc coated.	Your choice of regular cold-rolled for ordinary applications, mirror-bright for plating, or mirror-bright stainless or electro zinc coated for corrosion resistance.

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YOUNGSTOWN 1, OHIO

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assigned to each one and is held responsible for all the routine work within his area. All routine work is set up on a definite frequency and consists of hand oiling, filling spindle cups, oiling motors, general greasing, etc. Men are changed from one area to another periodically in order to train them as first class lubrication men and for supervisory positions.

Frequent Checks—If a machine is not running it is not lubricated. However, if it is down for more than 8 hours the rule is that it is not to be started until it is checked over for lubrication. The supervisor of production groups is responsible if the lubrication department has not been notified. Over the weekend when some machines are not running, a crew fills spindle cups and reservoirs. The men start up the machine 2 hours before the first shift begins on Monday morning. This procedure is followed so the operator can produce high precision work at the beginning of the shift without waiting for his machine to "warm up." The routine frequency is changed when and if a change is made from a 5-day week to a 6 or 7-day work week or vice versa.

Scheduled work pertains to those categories of lubrication which are set up at frequencies of 3 months or longer and consist of jobs such as greasing electric motors, changing the oil in gear cases, spindle reservoirs, etc. Oil in hydraulic and lubrication systems is set up to be filtered every 3 months. However, the oil is not filtered arbitrarily. If it is in good condition the filtration date is set up for another 3 months and so on until the oil needs filtering. Oil is filtered over and over again until such time as it becomes necessary for it to be changed. The change period is determined to a degree upon the neutralization number, but mostly upon other determining factors. The filters used are the portable type which permit the oil to be filtered while the machine is in operation.

One of the major expense items connected with lubricating machinery is walking time or transportation. Scheduled lubrication was set up so that not more than four trips to a machine are necessary during a year. Previous to this time more than ten trips were made. In order to accomplish this reduction in walking time, more categories of lubrication are serviced per trip and the best oils and greases are selected to extend the periods to conform to the schedule wherever necessary. Scheduled work is further confined to certain sections or divisions of the plant each month so the work is not scattered over a great area.

CATEGORIES OF LUBRICATION

1. Hand Oiled Parts
2. Spindle
3. Lub. or Central Reservoir
4. Hydraulic Reservoir
5. Ways or Ways Reservoir
6. Knee Reservoir
7. Headstock or Work Head
8. Tractor Wheel
9. Air Line Lubricator
10. Bijur Pump
11. Tail Stock or Chuck
12. Gear Box
13. Turret-Apron or Head
14. Worm Gear and Head
15. Transmission
16. Motor Gear Head
17. Motor Bearings (Oil)
18. Chain or Chain Drive
19. Motor Bearings (Grease)
20. General Grease
21. All Pump Bearings
22. Fan Bearings
23. Gear Drive
24. Open Gears
25. Couplings
26. Fly Wheel Bearings
27. Solenoid Reservoir
28. Trueing Device
29. Cables
30. Screw
31. Speed Range Unit
32. Automatic Lubricator
33. Filter
34. Clutch

Transportation Costs Cut—To cut transportation costs still further, sub oil stations are situated throughout the plant so that walking time to and from the station and the machines is cut to a minimum. Sixty-five gallon lubsters are used at these stations for small volume needs. For large volume, drums are set up on four-wheeled racks which enable them to be pushed from one machine to another. Oil in the lubsters and drums is checked daily by the supervisor and the necessary supply ordered.

Men doing routine work are furnished with four-wheeled carts which hold four 5-gallon cans. The carts have a compartment on the back large enough to accommodate a hand grease gun, buckets, oil cans and one grease gun filler bucket. These carts help to reduce still further transportation cost. Several years ago the regular engine oil used for hand oiling was replaced by a higher quality oil that costs more, but which made it possible to reduce the frequency of hand oiling by 66 per cent. The cost of the oil was reduced since only one-third as much was used and the machine life was increased because a better lubricant was applied. All these improvements in transportation resulted in reducing the working crew by approximately 55 per cent.

In order that the cost of lubrication service can be charged correctly to the various groups, a time study was taken of all operations. Servicing time for each category of lubrication was recorded together with walking time, delayed action, personal time, etc., taking into consideration several hundred machines and equipment. Number of grease fittings on each machine type were counted, etc. There are well over 700 various types of machines, so the task was not easy. This information was typed up in a report which lists the machines in each group with time allowances for each type of lubrication that is found on a machine. It also summarizes the information so that we know the lubrication labor cost per machine, group division or the complete plant.

Cost of lubricants used by any individual machine can be ascertained by recording the amount of all grease or oil added at intervals, plus the original fill on a record form hung on the machine. When a new machine is put into operation, or production increases by starting up an idle existing machine, the service time is added, and vice versa. The time study also shows how many lubrication service men are needed, and it helps to divide the sections equally since the production is such that a man may have fifty to seventy different types of machines and/or equipment in his section.

Identification Systems—Many systems have been used in the past to identify the oil with the part of the machines so that the application of the correct lubricant would be assured. A simple system was finally adopted that calls for applying a small red disk, with a silver letter imprinted on its face symbolizing a certain oil or grease, on the inside of the filler caps, spindle cup, snap cap, etc. Inside of cap was chosen for protection against the painting, soiling, or removal of the codes.

The lubrication service man reports all oil leaks to the supervisor of the group whose responsibility it is to request a maintenance work order so that the leak is repaired by the proper maintenance group. If a machine starts using more than the normal amount of oil, the supervisor is advised to call the machine repair department to remedy this condition. Likewise, if the lubrication or hydraulic oil is being contaminated by coolant or cutting oil, a request is made to supply the necessary guards or repair the leak. Many gallons of oil have been saved by this procedure. Schedules are also better maintained since it takes a great many unnecessary trips by the lubrication service men to keep a leaking reservoir filled.

The standardization and simplification program continually being carried on has further helped to increase efficiency. The program calls for simplification of methods, operations, filing systems, records, etc. Standardization of oils, greases, materials, grease fittings, motor high

(*Please turn to Page* 86)

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The Spotlight's on "Specials BY LAMSON!

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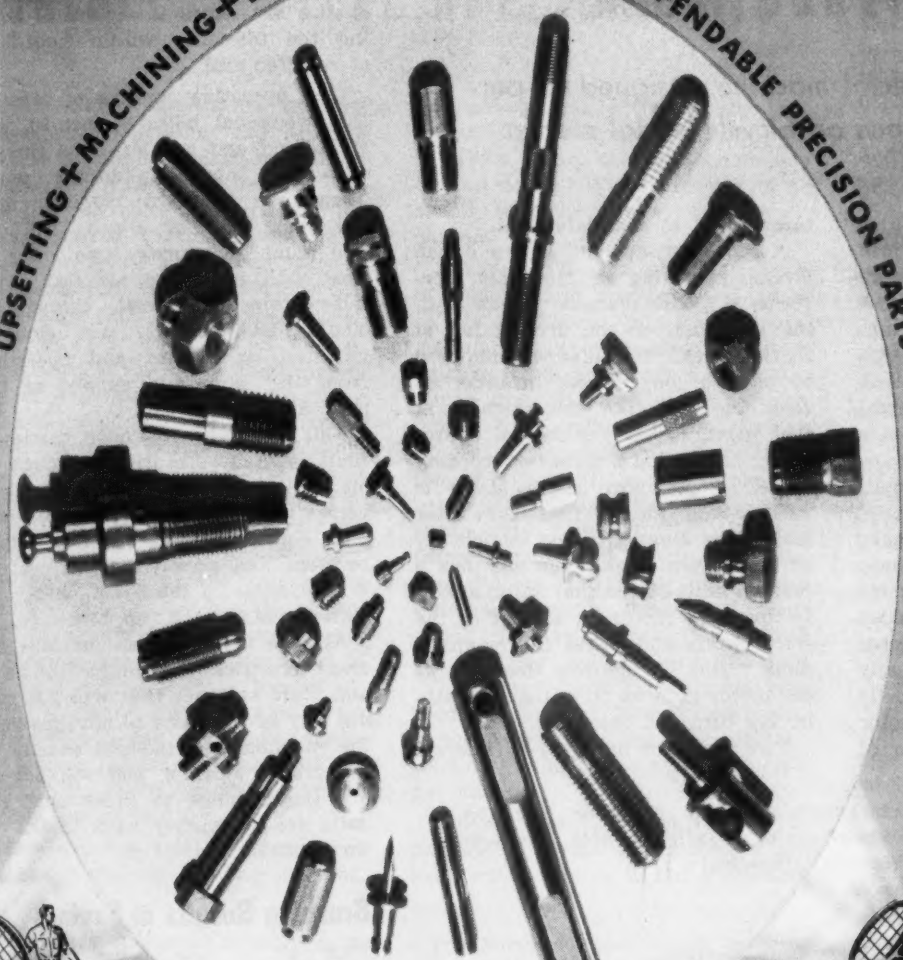

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TAPPING SCREWS	ROPE CLIPS	SET SCREWS	PLOW BOLTS
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LAMSON LOCK NUTS: Economical, vibration-proof. Can be re-used repeatedly.

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UNIFORMITY
In Finished Work

. . . promoted by special machine designed to perform four operations on bicycle pedal crank

FOUR machining operations on a bicycle pedal crank are performed at reduced production costs and with uniformity in finished work, on a special semiautomatic production machine. Three drilling and two tapping units manufactured by Black Drill Co., Cleveland, are employed on the machine. These units are operated by air, with a hydraulic check for feed control, and built with a patented traversing rotor.

By eliminating the customary splined shaft and using heavy duty motor bearings, torque is applied evenly around the solid motor shaft so that end play is reduced practically to zero. The rotor actually shifts in and out of the magnetic field; provision is made in the motor windings to compensate for loss of torque and to dissipate heat.

A special ¾-hp unit with a 6-inch stroke, operating at 1150 rpm, performs a ⅜-inch diameter hollow milling operation on the driving lug of the sprocket. This unit was required to have a long stroke in order to clear the frame of the machine at that point. It has 4 inches of nonrotating travel and 2 inches of working travel. A standard length stator is used which means that the rotor leaves the magnetic field completely on the return stroke; the unit has a built-in limit switch that automatically turns the motor on and off as the rotor enters and leaves the magnetic field. This is entirely feasible as the motor gets up to full speed within 1½ turns of the rotor.

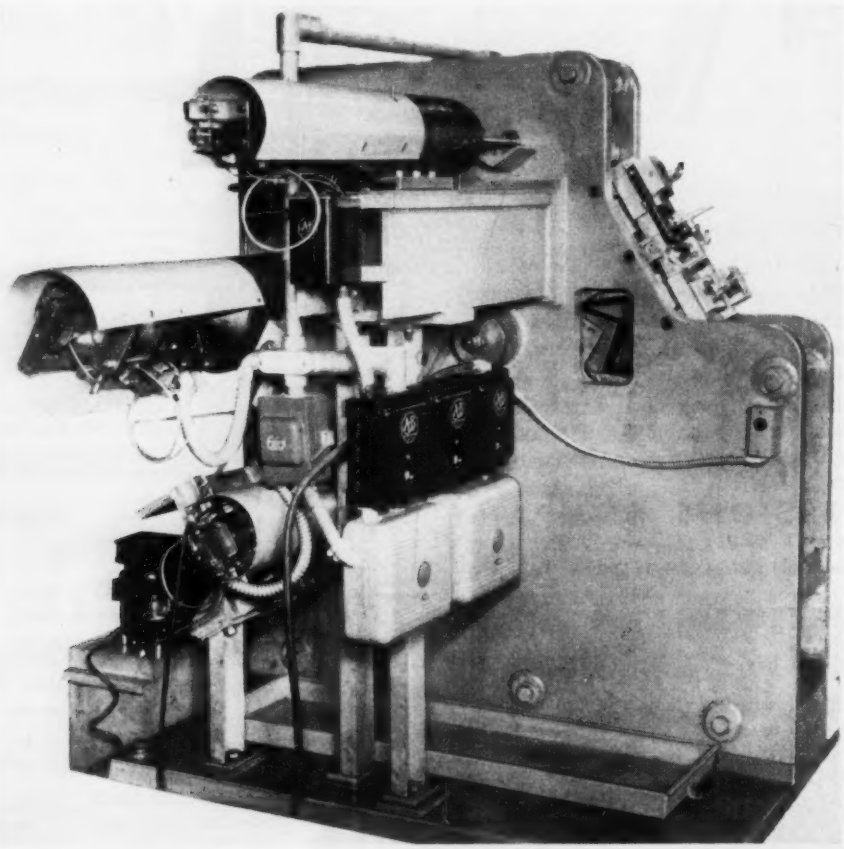
Two standard units, ¾-hp operate at 840 rpm for a combination operation consisting of a 7/16-inch tap drill size and a ¾-inch diameter spot facing of the bicycle pedal holes. The spot facing is held to close limits through the depth adjustment control on the unit which is capable of holding the tolerance within 0.001-inch of required size.

Last operation consists of tapping the two pedal holes ½-inch-20, one right-hand and one left-hand thread, with two opposed tapping units. These are standard tapping units, 540 rpm, built by Black Drill Co. The same traversing type rotor is used with controlled air feed, with self-contained reversal through a small double-acting air cylinder mounted on top of and operating from the same air supply as the main air cylinder.

This small air cylinder carries a limit switch operating through a magnetic reversing starter that reverses the motor at the required tapping depth. Because of the instant reversal and positive depth control, it is possible to tap even blind holes without danger of tap breakage.

All five units on this machine operate electrically through solenoids and limit switches that will not permit any of the units to advance until the machine has indexed exactly to the proper location, and will not allow the machine to index until the units are completely back in the return position.

Specially-designed semiautomatic machine which performs four machining operations on bicycle pedal crank. Courtesy Barth Stamping & Machine Co., Cleveland



Brushing Results in Savings

USE of a new power brushing process smoothes out polishing marks and brightens and prepares the surface of stainless steel division bars for automobile windows for final color bufling. Process has enabled a large producer of automotive parts to increase production to over 6000 per day; in addition, considerable monetary savings have resulted. Equipment used is a 14-head in-line polisher, in which the divider bar is placed in a holder moving on a continuous chain through the polishing line.

Power brush sections used in the process are made by Osborn Mfg. Co., Cleveland. The first four heads are Monarch tampico brushes used with abrasive. The last three stations are buffs run at 4000 rpm with sprayed abrasive. At this point the divider bar is finished on one side; it is then automatically rolled over and moved under a second set of seven heads to polish the other side.

At the end of the line, the bars are removed and placed on a conveyor rack which carries them through a Solventol bath. They are then dried and masked to prevent injury.

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Welding Process Extended to STAINLESS STEEL APPLICATIONS

SUCCESSFUL application of inert gas-shielded metallic arc welding process to chrome nickel or stainless steels and aluminum bronzes has come about since the original announcement of its use in welding of aluminum up to 2 inches or more in thickness (see STEEL, November 29, 1948, page 86). The process, developed by Air Reduction Sales Co., New York, involves continuous feeding of a coiled wire electrode in a gaseous shield through the barrel of a welding gun. High speed continuous deposition of filler metal is possible in all positions with a completely visible arc. Both manual and automatic equipment are available.

When applied to the welding of stainless, the process has the advantage of having the filler metal carried across the arc and deposited in the weld almost without loss of alloying elements. Use of titanium-stabilized filler metal is possible because the process transfers virtually 60 per cent of the titanium that may be present across the arc.

More stainless steel is deposited at a given value of welding current, minimizing heat effects in the base metal. The weld surface is dull, but it grinds, buffs, and polishes to any desired finish. Welds are said to be sound, without porosity or slag inclusion.

Bottleneck Broken—An illustration of the speed of application is given by J. S. Thorn Co., Philadelphia, manufacturers of welded aluminum window sash and frames. It was found that the welding of ¼-inch hinges to ⅛-inch aluminum frames was taking too long, but the installation of Aircomatic welding broke the bottleneck, cutting the welding time appreciably from 1½ minutes per frame. Individual welds with the new process were made in as little time as 5 seconds, these welds measuring ¼ x 1½ inches. Helium was the shielding gas used and 200 amp dc reversed polarity current was used. Type 43S 1/16-inch drawn aluminum wire was fed through the welding gun at the rate of 175 inches per minute.

When using 1/16-inch wire it is possible to deposit 15 pounds per arc hour when welding in the downhand position. Additional time is gained by no time out to change electrodes.

Heavy plate joint designs can be modified to have only a small included angle, resulting in large savings in welding material and time. The included angle may be reduced to 30 degrees as only the fine 1/16-inch diameter wire must reach to the bottom of the weld groove. Diameters of wire available are 0.035, 0.045 and 1/16-inch in AISI types 310, 316 and 347.

Formerly requiring 3 hours to weld a 4 x 5-foot aluminum tank side section, Martin-Quaid Co., Philadelphia, cut the time to 15 minutes with the use of the Aircomatic process. Using 1/16-inch drawn aluminum wire and 208 amp dc, wire feed speeds of up to 208 minutes were obtained.

Strain-Gage Research Extended

INSTANTANEOUS determination of loads on the plug and bar while seamless steel tubing was being rolled in the high-mill have been obtained from new dynamic strain-gaging equipment in the research laboratory of National Tube Co., Pittsburgh. In another research project exact figures were obtained on strains and stresses set up in a drill-pipe joint while the joint was being assembled, and later, while the joint was tested by bending. Residual stresses in pipe and a wide range of other stress-strain problems are now under study.

Available for use in the laboratory or in mills when desired are two 6-channel electrical resistance strain-gage units which employ a 2000-cycle carrier wave, with individual amplifiers and strain indicators, together with two recording galvanometer-type oscillographs capable of operation up to 500 cycles per second. It is capable of determining temperature drops at rates up to 2800° F per second. This latter equipment is being used to study quenching rates, readings from thermocouples attached to the specimen being recorded on the oscillograph.

A standard static-reading indicator has been provided which is capable of indicating results from SR-4 strain gages in terms of five millionths of an inch. A Fairchild oscillo-camera may be mounted on either of the standard oscilloscopes, making them available for use as recording cathode-ray oscillographs. Use of this equipment may be in determining peak strains under impact conditions or in studying hydraulic surges. In the camera unit, the film speed may be varied between 1 inch per minute and 60 inches per second.

German Welding Journal

GAS and electrical welding and cutting and surface treatment are within the scope of a new journal, Schweissen and Schneiden, published in Hanover, Germany. Published monthly by Friedrich Vieweg & Sohn, Braunschweig, it is sponsored by the Germany Welding Society.

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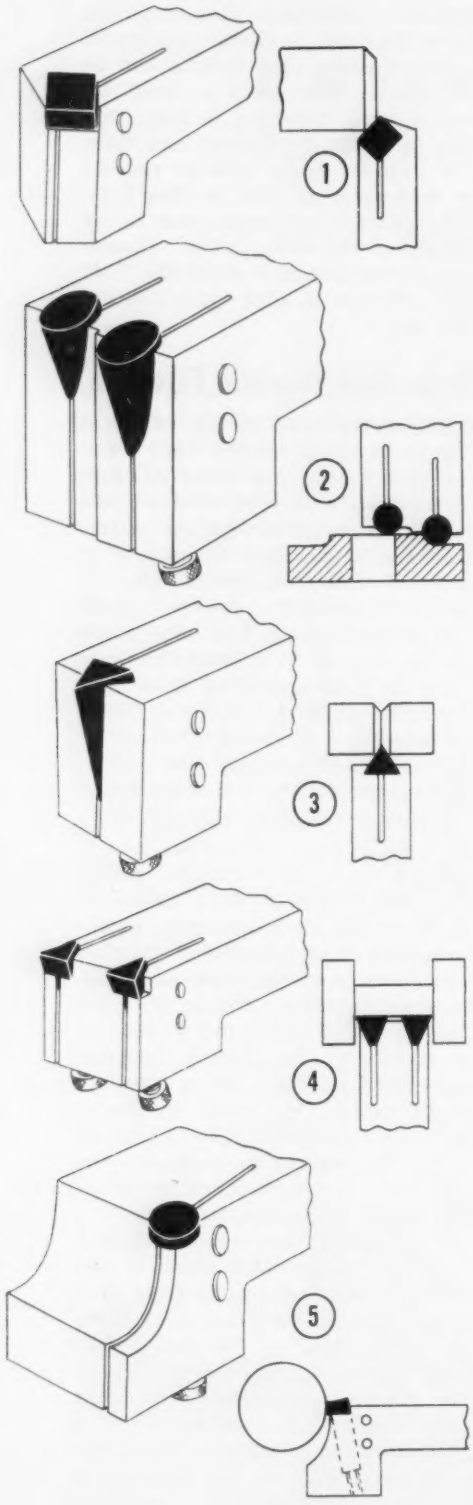

Examples of carbide insert tool designs for special purposes, embodying the principles noted in text. Holders here were developed by Carboloy Co. Inc., Detroit

DESIGN CONSIDERATIONS

Of Special Carbide Insert Holders

MOST common use of special carbide insert tool holders is where it is desired to incorporate some special angles, use two inserts rather than one, etc. Regular production machining jobs, for the most part, can be performed with the standard holders using standard inserts. Holders of a special nature also use the standard solid carbide inserts.

As an example of a special application, Fig. 1 shows a special tool holder made up for chamfering which uses a square insert, positioned at 45 degrees in the holder. Fig. 2 shows a holder for step turning or where it is desirable that one insert act as a roughing tool and the other as a finishing tool. In designing holders with two inserts, care must be exercised in locating the clamping screws as it may be necessary to have separate screws for each individual insert, there being the possibility that one insert will be clamped tightly and the other remain loose. Figs. 3, 4 and 5 show other special holders.

Special holders should be carefully laid out to make sure that there will be enough steel around the insert to give good clamping and ample strength. Another factor should also be considered: If space limitations make it necessary to substantially weaken a holder it may prove more economical to use conventional brazed tools.

Inserts Cannot be Changed — On some automatic machines, tools on the back are fed in on an arc, causing the effective rake and relief angles on the insert tools to vary with the diameter of the work. These cutting angles may be changed readily by grinding to suit the application with brazed tools, but on insert tools relief angles are predetermined by the holder and cannot be changed. Consequently it is often better to use brazed tools on such applications unless the length of run will justify a special holder.

Machining of soft steel, aluminum and certain nonmetallics where neutral or positive rakes are required often presents another cutting angle problem. Except for round inserts, which can be ground with a concave top surface to simulate a positive rake angle, it is difficult to grind positive rake angles into insert tools without destroying the long life advantage inherent in "on end" carbide inserts. Another factor to consider is the chip space problem sometimes posed by the relatively heavy front section of the holder.

In comparison, a brazed tool aside from its smaller bulk, also is usually ground with a secondary relief which gives some added space for chip clearance. The problem is particularly acute when several tool holders are mounted close together. Chip breakers that keep chips short and easily managed will usually forestall this difficulty.

Serrations Are Die-Broached

FORCING of broaching dies over the ends of long steering column shafts accurately forms serrations by broaching back of the threads on the shaft end. Shafts are broached two at a time by an automobile producer, columns being set into sockets in the base of a 20-ton, 12-inch stroke hydraulic assembly type press. They are clamped with movable slides on each side and are broached in one pass with one-piece dies having but one set of teeth.

According to Colonial Broach Co., Detroit, builders of the installation, an advantage of the setup lies in the simplicity of broach sharpening, the only operation required being the grinding off of the top face. Wheel is set at a slight angle and the die turned during the grinding so that the correct hook is produced on the cutting face.

Pressure Vessel Code Offered

RULES for the construction of unfired pressure vessels are covered in the 1950 edition of section eight of the ASME boiler construction code, published by American Society of Mechanical Engineers, New York. It embodies all code revisions that have taken place since the 1946 edition.

The 1950 edition covers carbon and low-alloy steels only, the rules for nonferrous metals, cast-iron and high alloy steels still being in preparation. Stress tables are based on a safety factor of four instead of five as in the previous code.

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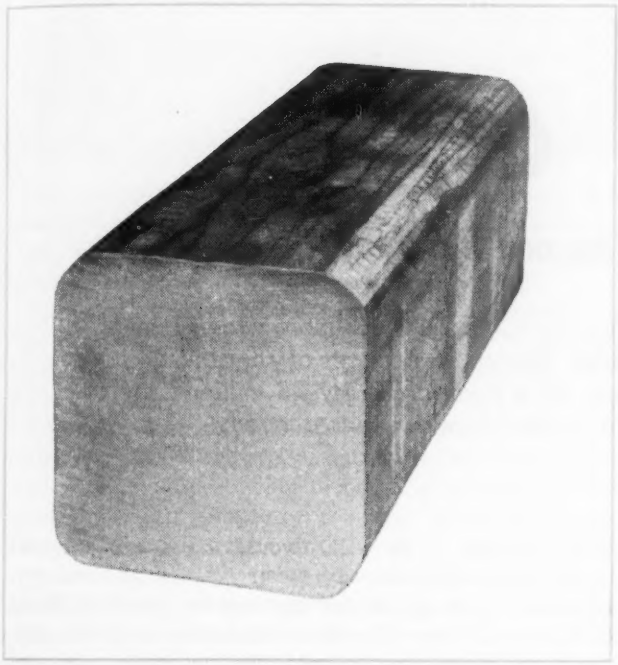

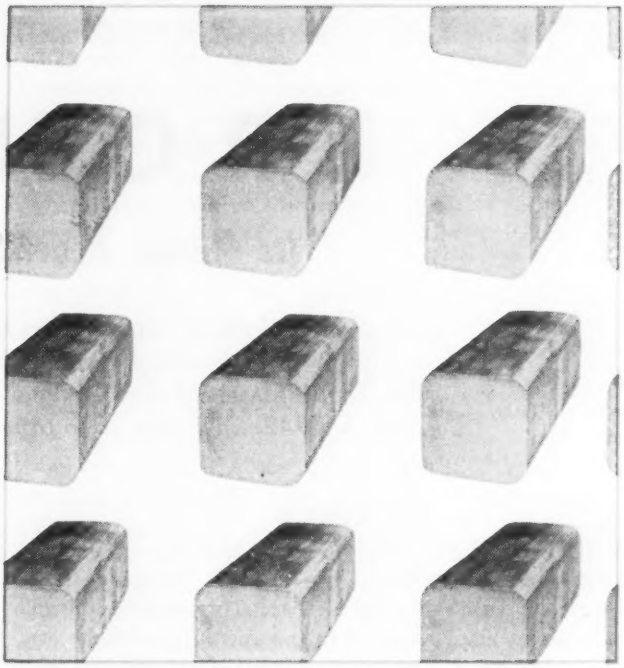

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By E. W. DAVIS
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IRON ORE

Its Mining, Beneficiation and Reserves

Iron ore beneficiation, herein described by the author, is much more widely used on the Mesabi range than in any other district. Shipments of concentrate from the Mesabi and Cuyuna ranges hit a peak of nearly 18 million tons in 1942, and since have averaged about 15 million tons annually

PART II

BENEFICATION, in the broadest sense, is any operation performed on ore after it is mined to increase its value and usefulness. This includes simple operations such as crushing, screening, sorting, etc., and also more complex operations involving fine grinding, followed by mechanical, electrical or chemical sorting and drying or agglomeration by heat. These more complex and expensive operations are usually grouped under the heading of concentration since the final product is a concentrate in which the valuable mineral has been collected into a smaller bulk by the elimination of undesirable diluents. Type of beneficiation treatment that is used depends upon the exact nature of the mined ore and the product required for marketing.

As cost of blast furnace fuel rises and specifications for finished steel become more exacting, smelting plant operators become more critical of the iron ore they receive. Structurally the ore should not be in large lumps because they heat up and reduce too slowly in the blast furnaces and it also must not be too fine or it will blow away as dust. What is desired is ore that contains no lumps much larger than 2 inches, certainly not larger than 4 inches, and which also contains little or no material finer than ⅛-inch. The ideal would have all particles about the same size, say ¼ or ¾-inch in diameter. However, most of the ore received by smelters is not of this structure. The great majority of direct-shipping ore from the Mesabi, for example, contains everything from 3 or 4-inch lumps down to the finest dust. In the past it contained lumps as large as 12 inches or more, but now most of this material is crushed before shipment and sometimes the fine dust is screened or washed out before the ore enters the blast furnace.

Smelting plant operators are also particular about the analysis of the ore they receive. For metallurgical reasons the operators using lake ore want an average of about 8½ per cent silica in the material they feed to their furnaces. They do not want the silica much under that but neither do they want it to be much higher because this reduces furnace capacities and increases operating costs. Again for metallurgical reasons they want the ore's sulphur content as low as possible, certainly not over 0.10 per cent, and for most purposes, desire the phosphorus content to be within the same limits. Shipments from the Lake Superior district over the past 20 years have averaged about 8½ per cent silica, 0.09 per cent phosphorus, and 0.02 per cent sulphur.

An ideal Lake Superior furnace ore for smelting in modern blast furnaces would be −¾-inch +⅛-

Fig. 5—Exterior view of a modern sintering plant at the ore mine

TABLE V
Screen Analysis of Typical Wash Ore

	% Wt.	% Fe
Crude Unsized	100.00	48.74
+1.050 in	7.00	49.50
+ .742 in	3.24	56.25
+ .371 in	13.50	58.95
+ 4 Mesh	12.27	58.58
+ 8 Mesh	9.30	56.55
+ 14 Mesh	7.83	52.20
+ 28 Mesh	4.52	54.45
+ 48 Mesh	8.66	54.00
+100 Mesh	10.42	50.55
+200 Mesh	9.83	38.25
−200 Mesh	13.43	20.85

inch hematite and analyzing about 52 per cent iron (natural), 8 per cent silica, 0.05 per cent phosphorus and under 0.05 per cent sulphur. If it contains a little alumina, so much the better.

Ores of various grades and types are mixed near the loading docks and furnace plants to produce average grades that best suit the operating plant to which they are to be dispatched. This mixing to produce desired grades is a very important operation and each ore-producing operator must study the ores available to him in order to determine what grades he can guarantee for each shipping season. To produce the grade desired by a customer may involve mixing ores from several properties and the production of a certain grade or type of concentrate. For this, as well as for other reasons, beneficiation plants are often constructed and equipped to produce a grade or type of product that, if shipped without mixing, would be entirely unacceptable because of chemical analysis, physical structure, or because of cost considerations.

Iron ore beneficiation is much more widely used on the Mesabi range than in any other district. Shipments of concentrate from the Mesabi and Cuyuna ranges hit a peak of nearly 18 million tons in 1942, and since that time, have averaged about 15 million tons annually. Over this same period the amount of crushed and screened ore shipped from Minnesota has averaged about 20 million tons annually but this type of beneficiation has become so general that accurate statistics are no longer available.

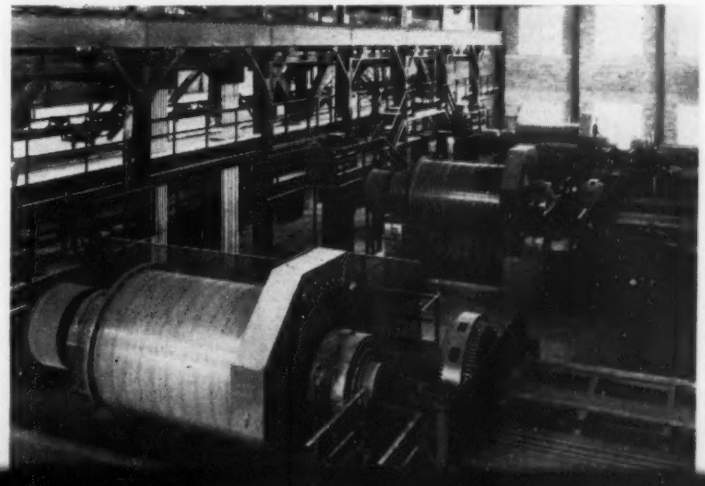
Early in Mesabi history a type of ore was encountered toward the western end of the range that existed in large quantities and was easily mined but analyzed too high in silica for direct shipment. However, the silica existed in the form of fine, free sand and good ore particles in the form of comparatively coarse lumps. Concentration of this material was a very simple matter as all that was required was the washing away of the sand, leaving lumps of very desirable iron ore, both from the standpoint of chemical analysis and physical structure. This material, known as typical wash ore, is well described by the screen analysis shown in Table V.

As early as 1907 Oliver Iron Mining Co. began concentration of this so-called wash ore at its Trout Lake plant. Their success brought others into the field and by 1916 four million tons of washed concentrate were being shipped annually. Since 1940 shipments have averaged better than 10 million tons and during the peak year of 1942, reached 14 million tons. To date, 218 million tons of washed concentrates have been shipped from Minnesota, which is about 13 per cent of all the ore shipped from this state.

As now practiced the washing operation is usually preceded by a crushing step which reduces the maximum size of the ore particles to approximately 3 to 4 inches and, in some plants, to a considerably finer size. This crushed material is then washed on trommels or screens, the oversize being finished concentrate and the undersize going to log washers or some other type of washing equipment which separates the coarse ore from the sand. The sand product, which necessarily contains some good, fine ore, then goes to classifiers of various types in which the final separation is made. Percentage weight of the total ore recovered as final concentrate varies greatly at different plants but is usually between 50 and 80 per cent. The grade of concentrate also varies widely but the district average, at the present time, is approximately 12 per cent silica. High quality wash ore of the type shown in Table V has largely disappeared. While silica is now a little high in most washed concentrate the structure is still excellent. It is in great demand, particularly for mixing with low-silica, direct-shipping ores of inferior structure. Strange as it sounds, besides removing silica, washing also removes water from the ore. The concentrate is often lower in moisture than the crude ore because clean lumps drain drier than when they are coated with sand and silt.

While washing is by far the most important method of iron ore concentration on the Mesabi and Cuyuna ranges other methods are in use that normally produce 2 to 3 million tons of concentrate annually. Jigging was an important contributor until the advent of the heavy media process which has now largely supplanted it. Jigging was introduced by Butler Brothers in 1924 because they encountered in their mining operations considerable ore of a wash-type but in which some of the silica existed in pieces too large to be washed away. Before jigging is attempted the ore is ordinarily crushed to about 1-inch in size and washed for the removal of fine sand and silt. The whole product is then jigged either without sizing or in sized fractions. Material finer than 6 mesh has always been difficult to concentrate by gravity means and new machines are constantly being

Fig. 6—Battery of rod mills is seen in this interior view of a concentrating plant processing New York state (hematite) ore



developed and tried out in the various plants for treatment of this size fraction. Hardly any two plants handle their fine ore concentration problems in the same manner.

For a number of years prior to 1945 shipment of jig concentrate in Minnesota amounted to approximately one million tons annually reaching a peak in 1941 when 1½ million tons were shipped. Butler Brothers, with their two plants at Nashwauk, have been consistently the chief producers of jig concentrate. Since 1945, however, jigging has been largely replaced by heavy-media separation, a concentration method developed for iron ore and introduced into this district by Butler Brothers about 10 years ago. Since 1945 heavy-media concentrate shipments have averaged about one million tons per year and shipment of jig concentrate has decreased to under one-half million tons per year.

Heavy-media separation for iron ore concentration consists first in preparing a high density fluid of finely-ground, high-silicon iron and water. The iron used assays about 14 per cent silicon, the requirement being to have silicon as high as possible to prevent oxidation and still not so high as to make the metal nonmagnetic. With a powder of this kind maintained in suspension in water by a small amount of agitation, a nonviscous fluid can be produced having a gravity as high as 3.4 if desired.

Into this high gravity fluid iron ore is fed, usually having been crushed to −1½-inch, washed, and then screened at ¼-inch or 6 mesh for removal of the fines. If gravity of the liquid is held at 3.2, for example, all particles of ore having a gravity higher than 3.2 settle to the bottom of the container and can be drawn off as concentrate. All particles having a gravity less than 3.2 float to the top and are skimmed off and rejected as tailing. It is, of course, necessary to wash and screen both the concentrate and tailing for recovery of the high silicon iron and this material, after being dewatered and cleaned magnetically for removal of slime and sand, is again ready for use. Ordinarily, the loss of high silicon iron amounts to about ½-pound per ton of ore treated.

This process is not now used for concentration of ore which is finer than 6 mesh. Fine ore is classified by any one of several methods and, ordinarily, an acceptable product can be made. However, much work is now being done on concentration of fine ore particles because of the desirability of producing shipping grade concentrate under 10 per cent silica. There is some indication that the heavy-media process may be so modified as to operate efficiently on ore particles down to 60 or 80 mesh in size. This would be an important improvement because it would permit finer crushing and even abrasion grinding of coarser material which would result in the production of lower silica concentrate.

Fig. 7—Linney-type magnetic separators remove the finely ground magnetic ore (hematite) from the rock in which it was contained

From time to time drying plants have been operated on the Mesabi producing a few hundred thousand tons of dried ore annually, but on the Cuyuna, drying and sintering are important beneficiation processes at the present time. Between one-half and one million tons of dried and sintered ore are shipped annually from this range. The drying operation simply removes some of the moisture and, therefore, reduces shipping weight by a proportionate amount. The sintering operation removes all of the moisture, most of the ignition loss, and greatly improves the structure. This is a much more expensive operation, however, and at the present time there is only one sintering plant operating on the Minnesota iron ranges.

There has been practically no concentrate produced in the United States Lake Superior ranges outside of Minnesota, although concentration of some of the Michigan low-grade ores is now receiving attention. Low-grade ore materials that can be mined by open pit methods are of great interest at the present time both in Michigan and Minnesota but low-grade ores requiring underground mining are of interest only in exceptional cases because of the high mining cost.

There has been great activity throughout the Lake Superior district during the past few years in acquiring lands known to contain a type of low-grade, iron-bearing rock called "taconite" in some localities and simply "iron-formation" in others. Amount of this type material in the Lake Superior district is enormous and the mining companies in need of new reserves are carefully studying methods required to concentrate this material. Laboratory and pilot-plant work in the Lake Superior district is very active at the present time, and if the mining companies decide they can beneficiate the iron formation economically, concentration in this area will be greatly expanded.

Practically all ore produced in New York and Pennsylvania is concentrated. Much of it is mined by underground methods and, on the average, something like two tons of ore are mined and processed to produce one ton of shipping product. These ores are all basically magnetite and concentrated primarily by magnetic concentrating methods. In general, it consists of crushing, followed by fine grinding in rod and ball mills to 10 mesh or finer, followed by magnetic concentration. The concentrate produced is high grade but too fine for blast furnace smelting and, therefore, is sintered to produce an excellent furnace ore. At several plants the nonmagnetic tailing is retreated to recover additional values. At MacIntyre in New York ilmenite is recovered from the nonmagnetic fraction and at several of the other plants martite is recovered. At the Lebanon plant

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Fig. 8—Washing plant and car loader in operation on the Mesabi range

of Bethlehem Steel Corp., copper, cobalt and sulphur are recovered.

At a number of these plants some comparatively coarse concentrate is recovered before fine grinding. This is shipped to steel plants and used directly in open-hearth furnaces. At some plants coarse waste rock is rejected and in other eastern plants sale of this rock reject for highways and concrete-making purposes is an extremely important economic consideration.

All of these plants were originally operated using dry concentration methods. Many were equipped with dust-collecting systems, however, they did not entirely keep the plants from being dusty. As dust hazards became better recognized the plants were gradually changed over to wet grinding and concentrating operations. The result has been the complete elimination of dust and also an improvement in metallurgy because separation of iron minerals from the waste rock can be made much more complete by wet concentration. In addition to this, the wet concentration method places no limit upon the fineness to which ore can be crushed and, therefore, a much higher grade product can be produced. All plants now in operation in New York and Pennsylvania use wet concentrating methods.

Concentration of Birmingham district brown ores has been carried on for many years and it's believed the Minnesota-type log washer had its origin in the south's brown-ore districts. Originally, this machine was a real log set to rotate in crude bearings in an inclined trough. Steel paddles, or just heavy spikes, were attached to the log in the form of a continuous helix so that, when rotated in a wet mass of ore and flowing water, the heavier and larger ore particles were carried up the slope and discharged at the upper end while the lighter, earthy pieces overflowed a dam at the rear. Modern log washers work on this same principle but are of heavy steel construction.

Fig. 9—New York state iron ore bearing rock is first crushed to sand form and the iron removed by magnetic separators. The crushed ore is then fused by mixing it with coal and subjecting it to a high temperature in a process known as "sintering". Large building on right contains the separating equipment and building on left is the sintering plant

Normal production of brown ore concentrate averages around half a million tons annually, but during war years, it was increased to a little over a million tons. This output comes from a number of properties, many of them quite small. Brown ore concentrate is highly limonitic, and if the silica is low, it is quite desirable blast furnace feed.

Red ores form the principal supply for blast furnaces in the Birmingham area and this type material is difficult to concentrate. As mined, red ores contain only 30 to 40 per cent iron and need for concentration has been felt for many years. The iron minerals are hematite and limonite and, due to the structure, the ore must be ground fine before the iron particles are freed from the worthless gangue minerals. Several concentration methods have been attempted on a commercial scale but the only plant now in operation is that of Republic Steel Corp. at their Spaulding mine. Here the ore is crushed and ground to a fine size and then concentrated by a combination of hydraulic classification and tabling. Real trick of this process, however, is to adjust the operation of the grinding mill to process the softer iron minerals and leave the harder, gangue minerals as comparatively coarse grains of sand. The Spaulding plant now has a capacity of about a quarter of a million tons of concentrate per year, all of which is sintered before being charged to the blast furnaces. The Birmingham district is handicapped because of a lack of high-grade ore. There is some indication that in place of expensive and somewhat inefficient concentration operations it may be more economical to import high-grade ore from South or Central America for mixing with the local red ore that exists in such large quantities.

Limited amounts of ore are concentrated at other places in the United States using methods that have already been mentioned. At Iron Mountain, Mo., the M. A. Hanna Co. is operating a washing and jigging plant at the old Iron Mountain property that has produced iron ore spasmodically since before the Civil War. In Texas practically all ore produced is washed, classified and concentrated by one method or another for the removal of sand and clay. In Utah and Wyoming attempts have also been made to concentrate some of the ores but at no place has concentration even approached the position of importance that it occupies on the Mesabi range in Minnesota.

As the high-grade ores of the Mesabi are exhausted, concentration is certain to become more and more important. This does not mean that the cost of producing iron and steel will necessarily increase because of the increased costs of producing the ore. Technological improvements have more than kept pace with rising costs in (*Please turn to Page* 92)

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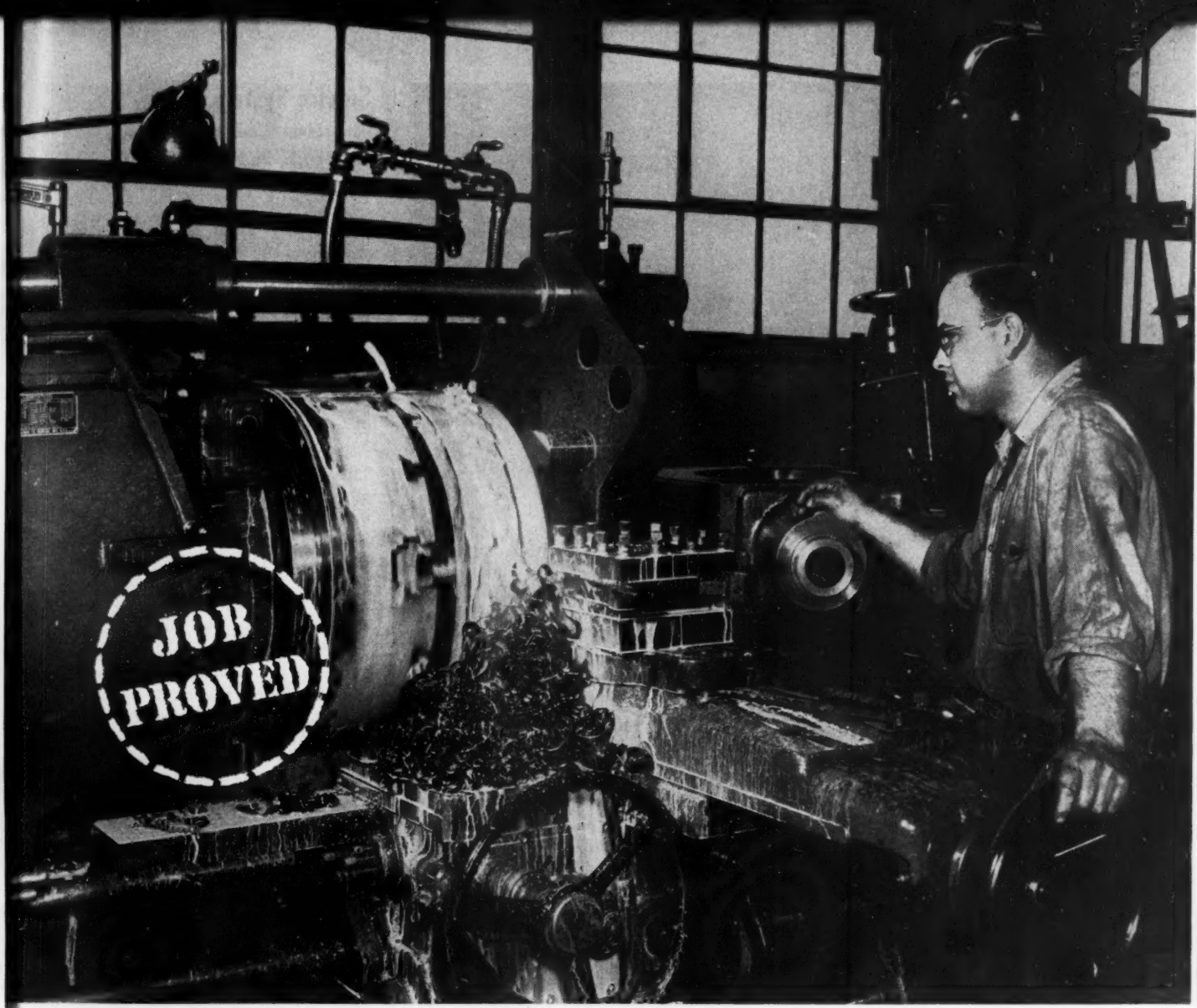

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(*Continued from Page* 70)

level cups, and numerous other items make the job easier and more efficient.

Servicing Time Reduced — Over a year ago the lubrication department serviced 129 machines with straight cutting oils in a test case. It was found that the servicing time was cut by 75 per cent under the time it took the operators of the machines to do the job. Needless to say, the go-ahead signal was given on the balance of the machines and on the rest of the cutting and coolant oils. The checking and ordering of these oils was taken over first. This acquainted us with the type of oils and quantities so that charges would be prorated to the various groups correctly. In order to satisfy everyone a list of machines, together with their numbers, in each foreman's group, was prepared. These were given to the foreman with a request that he insert the name of the cutting oil being used, and in the case of a coolant to include the mixture. Meanwhile, all the coolant tanks in the plant were measured so that the exact gallon capacity was recorded. Pump displacement was also taken into consideration.

The returned lists started coming back and showed that twice the number of men would be needed to prepare all the various mixtures requested. After a consultation with the chemical laboratory, which controls the selection of new cutting oils and coolants, and general foremen of the productive groups, it was decided to extend the control of the mixtures and oils to the lubrication department. This situation is mentioned only because it is typical when operators service their own machines. The servicing of one straight cutting oil was taken at a time to avoid confusion. A tag was attached to each machine bearing the machine name, number, bay and name of the oil used. When this was completed, the coolants, one oil at a time, and only part of a division were added. Here again tags were hung on the machines. Mixtures, number of gallons of oil that have to be used in the event the tank has been cleaned by tank cleaners and refilled with water, were included on the information tag.

In the event a tank is low and requires a mixture of water and oil, the lubrication service man adds this mixture. It should be stated that the sections were made smaller. A lubrication man is responsible for servicing coolants and cutting oils along with lubricating oils and greases. All

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existing drops for water, paraffin oil, etc., were put into use, and wherever necessary additional drops were installed, suitable hoses attached to these drops so that machines in the area could be serviced direct from the line to the machine. Special reels were purchased that remain attached to the faucet while unreeling or reeling in.

Fifty-five-gallon drums were set up on four-wheel dollies in which soluble oil and water are premixed in exact proportions desired. These drums are pushed from one machine to another when it is necessary to replenish the supply. Flow of water was timed at several outlets and found to vary in different sections of the plant. Knowing the gallon flow, it is possible to fill large tanks with water direct from the hose by figuring gallons on a time basis.

The proper amount of oil is then added, depending on the number of gallons of water. Calibrated measuring sticks were made for large reservoirs so that they could be measured to determine how many gallons of water were added. Knowing this, the correct amount of soluble oil is added. Rate of water evaporation was also figured so that at specified intervals water was added to make up the deficit. Now that tanks are kept at the proper levels, pump life has increased and the draining of tanks is set at lesser frequencies than was formerly necessary.

Laboratory Supervision—No change in cutting oil or coolants can be made unless an approved cutting or coolant change form is first signed by the laboratory, lubrication department, and finally by the department head of the production group. There have been very few changes requested as a result of instituting this form. Also, if a test is to be run on a new oil, the three persons mentioned above sign the test approval form. The form provides spaces for a report of performance which is recorded daily by the lubrication department and submitted to the laboratory, and which makes the final decisions.

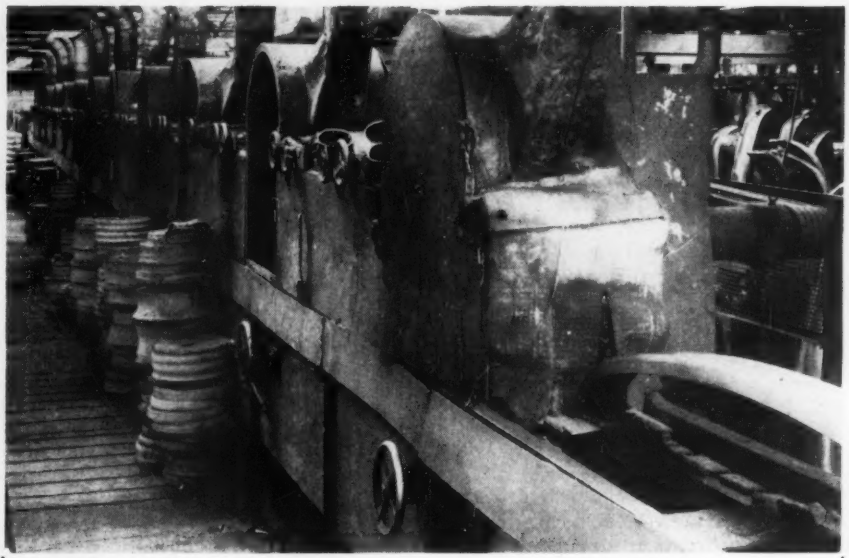
When the cutting oil program was completed, the ordering and servicing of general purpose oil was turned over to the lubrication department. Now the operators of machines who are paid a higher rate than the lubrication service men spend 100 per cent of their time on production. When operators lubricated the machines themselves, cost of the job was higher and much production time was lost.

With reference to the frequency of lubrication schedules, recommendations, etc., all this information is recorded in a visible file which contains a card for every machine and/or equipment in the plant. This is necessary since some machines are constantly changing locations, and new ones are coming in. These cards, see accompanying illustration, give complete information about lubricating oils, cutting, coolant and general process oils in any machine. The cards bear the following: Name of machine, number, location, and division on the bottom line so it is plainly visible in the file. In the upper left corner are the numbers 1 to 35, each number represents a category of lubrication. The various lubricants are lettered, making it an easy matter to print the code of the oil opposite the category found on the machine.

A simple example of this system would be 1-H, 2-C, 19-S. No. 1 represents hand oiling with H-oil, 2 represents spindle with C-oil, and 19 represents motor grease with S-grease. Codes eliminated 75 per cent of the typing that was formerly found to be necessary.

To the right of this box is a place to list materials used for added accessories on a new machine. The next box to the right is used to record the gallon capacity of each reservoir found on a machine. Below and in the first wide column the number of the category is listed which is scheduled at intervals of 3 months or longer. In the next column the frequency is listed by the numbers of months. To the right and in the column next to the double line, date machine was serviced is recorded. Next column is used to set up the next scheduled date. At the bottom, J, F, etc. represent the months of the year. The file is checked at the end of the month and all the scheduled work for the next month is recorded on a work sheet and is given to the supervisor for further handling. When the work is completed and checked off, the sheets are returned to the office and the next service date is set up.

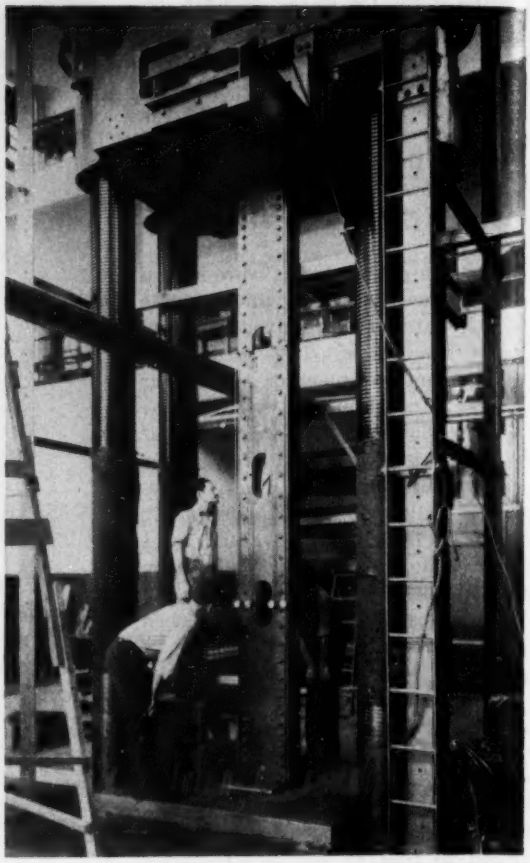
Cutting and general purpose oils are more or less self explanatory. Numbers are used for straight cutting oils from 1 to 19 and numbers in increments of 10 from 20 up to 90 for coolants. The tags are now in the process of being eliminated and the soluble oil codes will be imprinted on the tanks, in the following manner: If the oil is No. 20, the zero will be dropped, if the mixture is one to 40, the one and the zero are dropped and if 3 gallons of oil are to be added for the make up of a full tank the result will be 243. The general purpose oils are identified on equipment C-1, to C-5, C for cleaning, R-1 to R-5, R for rust preventives, T-1 to T-5, for testing fluids, etc.



SO SMO-O-O-TH: By blending all grit marks on mass produced cold rolled steel bumpers to permit a smooth chromium plate application, Sharonville, O., plant of Auto-Lite is reducing production costs and number of rejects. Power brushes supplied by Osborn Mfg. Co., Cleveland are incorporated in the 2100 rpm multihead polishing machines. A nine-head rotary machine polishes the bumper edge, followed by a 12-head in-line machine for the bumper face and eight tandem machines for the curved ends. After a cleaning bath prior to copper and nickel plating, bumpers are cut and color buffed in preparation for the chromium plate

PERFORATED COVER PLATES

. . . improve strength of structural steel columns



Data on such properties as axial shortening, deflection at midheight of the column and maximum load of perforated cover plates were obtained from the maximum-load test in the 10-million pound testing machine at National Bureau of Standards. Note compressometers on the column for measuring these properties

A STUDY of the mechanical properties of perforated steel cover plates for bridge columns, utilizing full-scale models, indicates that strength of columns built from the plates and angles is greatly enhanced. Formulas were derived that may be applied whenever data are required concerning displacements in a structure having perforated members; the validity of these formulas was confirmed by experiment. It was found that the net area of a perforated-plate column may safely be used for design purposes even for a perforation shape that produces great stress concentration.

The tests, carried out by the National Bureau of Standards over a period of years, in co-operation with the American Institute of Steel Construction, consisted of investigations of the cover plates with respect to stress distribution, strength and axial stiffness. The experimental results of these tests proved to be in close agreement with theoretical predictions; they provide engineers with a rational approach to the design of bridges using cover-plate columns.

Box-type Cross Section — Most large compression members of bridge trusses have a box-type cross section in order to provide efficient utilization of the material in resisting column action. It is desirable to provide openings in the member to allow access to the interior for inspection and painting; common practice is to use two channels (or four angles and two web plates) with a cover plate on one side and lattice bracing or battens on the other.

Lattice bracing or battening serves to brace the flanges of the channels or angles and to transfer shear so that the full moment of inertia of the remainder of the cross section is developed, but it does not contribute to the cross-sectional area effective in resisting thrust. Recently a more economical design in which the bracing is replaced by a perforated cover plate has been used (see photo). The purpose of the bureau's investigation, which was conducted in the Engineering Mechanics Laboratory under the direction of Dr. A. H. Stang, was to determine the effects of the perforations on the structural properties of these plates.

Tests in the elastic range have been made on columns with plates having circular, ovaloid, elliptical and square perforations, as well as on columns with solid plates. Maximum compressive-load tests have also been made on these columns. In order to limit the investigation to a reasonable number of columns, it was decided to use cover plates of only one thickness, namely, ⅜-inch, and to use 8 x 4 x ½-inch steel angles with the plates to complete the columns. Plates and angles were open-hearth low-carbon steel. The cover plates were 15, 20, 25½, and 30 inches wide and 14 feet 9 inches long. Columns for the tests were made with each type of perforation in each width of cover plate. In addition, three different spacings of the perforations were used. For control, three unperforated plates of each width were made into columns to be tested.

Both perforated and unperforated plates were subjected to compressive tests in the elastic range with two angles or with four angles bolted to them. After these tests were completed; specimens consisting of a plate and two angles riveted together were subjected to maximum compressive load tests.

Axial Stiffness—Axial stiffness was measured on each column in a 600,000-pound capacity testing machine using compressometers having a gage-length equal to the length of the perforated plate between the centers of two perforations, and, for the unperforated plate columns, not less than one-third the length of the column. Corrections were made to take into account changes of temperature. Strain readings were taken at two loads—at a small initial load and at the largest load for the determination of the modulus. Calculations of stiffness according to theory are in good agreement with the experimental values, differing, except for a few scattered values, by not more than plus or minus 0.02. The general tendency is for the experimental values to be less than the theoretical.

For many of the columns, the complete stress distribution over the middle bay of the cover plate was obtained from hand strain-gage readings. A novel feature of this work was the arrangement of the rosettes. Strain-gage holes for 2-inch gage lengths were drilled on both sides of the plate in a continuous equilateral-triangular pattern so that each hole (except those near edges) served for six gage lines. This arrangement provides uniform coverage of the area with a minimum of gage holes and

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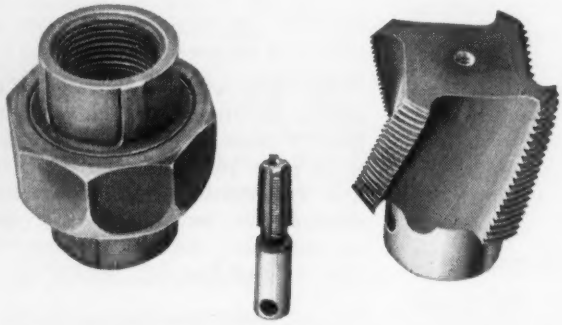
look what can happen when you

refuse to be satisfied with "EXPECTED PRODUCTION"

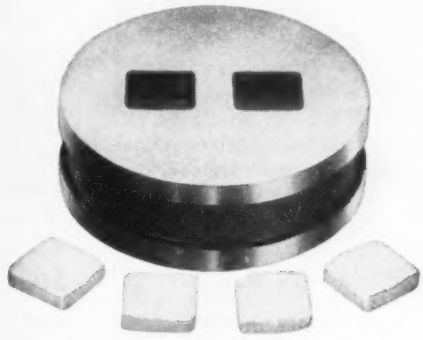
from tools and dies . . .

Many tooling men have said: " . . . Our tools are running along O.K.—things are satisfactory". Yet, after these men discovered a more foolproof way to select the proper steel for the job, they wondered why they were ever satisfied with "average" tool and die performance. And look at the results they are enjoying:



Operators Objected to the Change . . . But Now They Are Convinced!

Everyone claimed these taps for threading cold forge unions were running along "O.K.". But the T.R.F. wasn't convinced. He used the Carpenter Matched Set Method to pick the one steel best suited for the job—SOLAR (Water-Tough). Now production is up 350%—and today the operators *insist* on taps made from SOLAR! It can happen in your plant—if you *refuse* to be satisfied with "Expected Production".



Production Was Considered "Satisfactory" . . . But That Didn't Stop This Toolmaker:

This die preforms tablets from Bakelite powder on a preform press. Even though the highly abrasive plastic created a wear problem, production was considered "satisfactory". Yet, in a desire to investigate every possibility for reducing costs and boosting output, the toolmaker changed to a steel in the Carpenter Matched Set. Now, with K-W (Water-Wear), the die lasts twice as long as those previously considered "satisfactory"—and 8 to 10 hours are saved between grinds!

Existing production records *are* being broken daily, tools and dies *are* producing more, giving less trouble. And tooling men who are no longer satisfied with "Expected Production" are cashing-in on lower costs. The Carpenter Matched Set Method has *proved* it can help you do the same. Best of all, it is amazingly easy to use because it is simplification itself! It simplifies selection, heat treatment, inventories—practically all toolmaking operations. You'll never know the job it can do unless you try it. Prove it to yourself—it's easy. Simply pick out a job—put the Matched Set Method to work—then compare results!

Export Department, 233 Broadway, New York 7, N. Y. "CARSTEELCO"

—And you can get IMMEDIATE DELIVERY from LARGE STOCKS!

Carpenter

MATCHED

TOOL & DIE STEELS

Offices and Warehouses in Principal Cities Throughout the U.S.A. and Canada

THE CARPENTER STEEL COMPANY, 139 W. Bern St., Reading, Pa.

readings. Very careful jigging of the holes was required to keep all the gage lengths within the small range of the Whittmore strain gages used. From the data obtained, all of the elements of the stress distribution were computed and presented graphically as isograms of principal stresses and their directions.

Stress Distribution—Distribution of stress on the edge of the perforation at mid-height of each column was obtained from strain-gage readings taken by hand. These stresses were compared with values computed from a theory derived by Martin Greenspan of the bureau staff, in which an exact solution to the problem is obtained for a hole having any boundary of which the equation can be expressed in certain parametric forms. In general, the agreement between theory and measurements is good although in many cases the measured stress exceeds the theoretical value at the position of maximum stress.

Twenty-four two-angle columns, as well as four controls (solid plates) were tested to destruction. Most of the columns failed by bending away from the plate side as would be expected because of the local eccentricity near a perforation.

Iron Ore

(*Concluded from Page 84*)

the production of other metals from lower grade ores and the same can be expected for iron and steel. Recently some experiments were made in the smelting of high-grade, agglomerated, magnetic taconite concentrate from the Mesabi range. These tests indicated a much lower coke consumption in the blast furnace and a much higher production rate of metal than with standard ores. Processed ores are really tailor-made for subsequent smelting operations, and while it may cost more to process and prepare the ore, the saving that can be made in transportation and smelting can actually provide cheaper metal in some instances than from ores that are high-grade as mined.

(*To be continued*)

Red Lead Protects Steel

STUDY of some 34 kinds of protective systems by Battelle Memorial Institute, Columbus, O., and American Iron and Steel Institute, New York has shown that red lead appears to be highly satisfactory for enclosed structural members in steel housing construction. Experiments with the coatings included continuous immersion in water, contact with air at high humidity, continuous condensation, alternate wet-dry conditions and continuous contact with insulation in the presence of water.

Tests were intended to stimulate both severe and moderate conditions of service and to form a basis for valid comparisons between the effectiveness of the various systems studied. AISI report No. 31 reported that red lead has a good blister rating and affords protection to the base metal as evidenced by low weight loss and slight visual evidence of attack on steel.

Tool Practice Films Offered

SIX educational-type slide films covering carbide single point tool practice are available in kit form from Carboloy Co. Inc., Detroit. Based on information contained in the company's recently released carbide tool manual, the films amplify a similar set released during the war.

Included are six booklets containing sections from the manual covering and supplementing material presented in the film. Books are said to serve the dual purpose of serving as a shop reference and permitting a more detailed study of the carbide "know how" set forth in the films.

Steel Alloys Resist Corrosion

ELECTROSTEEL alloys with fundamentally improved chemical and corrosion resistant properties are a development of Uniworld Research Corp. of America, Cleveland. All grades of these steels can be melted in the usual electric arc and induction furnaces from readily available raw materials. They are not sensitive as to their carbon content and are said to have good castability, smooth surface and may be machined, ground and polished.

Crane for Various Operations

EASILY convertible to a magnet, ½-yard dragline, clamshell, shovel or trench hoe, is the 7.5-ton, crawler-mounted industrial crane, announced by Wayne Crane Division of American Steel Dredge Co., Ft. Wayne, Ind. Known as the model 66, it is powered through direct-drive propeller shaft assembly from a "direct power flow" transmission which is remotely located from the power unit and connected by a right-angle drive and universal drive shaft.

Power is furnished by a 6-cylinder gasoline engine developing 62 hp. Other makes of diesel or gasoline engines of required power and speed may be furnished.

LETTERS *to the Editors*

Heatless Welds

We note from an article in one of our local papers, namely, *The Milwaukee Journal,* that there was an article published in STEEL announcing a new development of a welding process--a technique that permits pieces of metal to be fused without use of heat, electricity or chemicals, by William Dubilier, founder of Cornell-Dubilier Electric Corp. and that there has been a new company formed, the Koldweld Corp.

We are wondering if you have any information pertaining to this process in your files, or if you know how we can get in touch with this company.

R. J. Hess
Purchasing Agent
Alloy Products Corp.
Waukesha, Wis.

We read with much interest the article on Heatless Welding in the Nov. 7 issue of STEEL. The article is on page 109 under the Production and Engineering News at a Glance column. We would like very much to have more information about this type of welding.

H. C. Henderson
Goddard & Goddard Co.
Detroit, Mich.

The process was also covered in an article, "Heatless Process May Change Welding Practice," on page 117 of the Nov. 21 issue of STEEL. For more information write Mr. William Dubilier, president, Koldweld Corp., 10 E. 40th St., New York, N. Y.—The Editors

Pricing Compliments

I would like to offer my congratulations on the development of your new method of quoting prices in STEEL. It is certainly the most complete setup that has ever been devised and will surely be of great help to all of the readers of your magazine who are interested in the buying and selling of steel products.

F. G. Syburg, Chairman
National Committee on Steel
National Association of Purchasing Agents
New York, N. Y.

Gears, Planetary

We would appreciate it if you could forward to us names of companies which specialize in manufacturing planetary gear drives.

Hans Lieb
Great Lakes Industries Inc.
Duluth, Minn.

List of manufacturers being forwarded.—The Editors

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New Products and Equipment

Machine Cast Pigs

Complete and self-contained, the foundry pig casting machine manufactured by William M. Bailey Co., Pittsburgh 16, Pa., may be erected wherever convenient and moved by crane or other means to any desired location. It consists of the machine proper, motor, gear unit, variable speed reducer and drive.

Slight wear that occurs as the 15-inch cast link chain moves over the

end sprocket wheels is confined to the high manganese steel bushings and pins. Machine can be furnished in lengths from 15 feet to 100 feet or longer in multiples of 5 feet. Positioning of the unit may be to load the pigs directly into the cars if desired, thus reducing handling costs.

Check No. 1 on Reply Card for more Details

Front Wheel Drive Crane

Featuring front wheel drive for full traction at all times, the Karri-Go 5-ton front boom industrial crane, manufactured by Silent Hoist & Crane Co., Brooklyn 20, N. Y. is steered by

wheels at the rear. Load rides on a dead axle. Crane can climb a 10 per cent grade with full load on the hook.

Four speeds forward up to 14 mph and 1 speed in reverse are provided. An auxiliary reverse transmission is available, providing all forward speeds for traveling in reverse. Safety features built into the crane include large engine hoist and auxiliary units, lowering and raising of boom by power, and single lever control of hoisting, power reverse-gear lowering and holding in neutral. No part of the boom, cables or chains passes over the operators head. Load is held by automatic braking.

Check No. 2 on Reply Card for more Details

Multipurpose Broaching Unit

Universal ram-type hydraulic broaching machines, introduced by Colonial Broach Co., Box 37, Harper Station, Detroit 13, Mich., may be used interchangeably for all conventional broaching operations, including surface broaching, internal push-broaching, slotting and press work. Machines are available in 4, 6 and 10 ton capacities with 24 and 36-inch strokes.

Hydraulic system provides excess

capacity for occasional overloads. Ram operating piston rods are protected so as not to be exposed to chips or foreign matter. The coolant system has its own separately motorized impeller type pump. Machines can be furnished with special circuits for operating receding tables or fixtures.

Check No. 3 on Reply Card for more Details

Pressure Cell Line Expanded

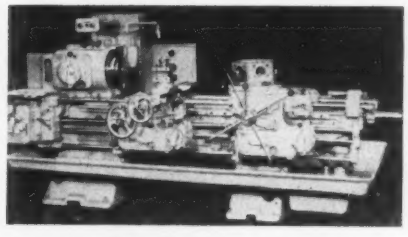
Five new SR-4 type load and pressure cells extend the range of standard models on both low and high sides, according to Baldwin Locomotive Works, Philadelphia 42, Pa. Sensitive elements of these cells are SR-4 resistance wire strain gages. In the load cells, SR-4 gages are bonded to a compression column, loads being indicated or recorded manually on self-indicating type instruments.

Two new compression type load weighing cells of 100,000 and 200,000 pounds have been added to the line. Size range of recently developed universal load cells for both compression and tension loads is extended upward from 50,000 to 100,000 pounds. New load beams make it possible to obtain load measurements down to 2 grams, full scale. Also added are 10 psi and 100,000 and 150,000 psi fluid pressure cells.

Check No. 4 on Reply Card for more Details

12-Inch Chuck Capacity Lathe

Completely redesigned, the model 7A saddle type universal turret lathe, announced by Jones & Lamson Machine Co., Springfield, Vt., has a 2½-inch bar and 12-inch chuck capacity.



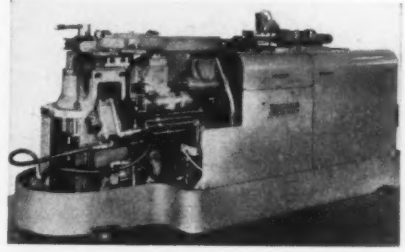
It combines advanced construction and control features with improvements to provide rapid metal removal. Design of the bed emphasizes strength and rigidity and provides for increased chip disposal facility.

Threading to maximum turning length with carriage or saddle is possible with a full length lead screw. An all-sliding-gear quick-change gear box with single lever selector provides a wide range of pitches. Cross slide and saddle are equipped with power rapid traverse and the turret is power indexed. Two ranges of 12 spindle speeds, 20 to 1000 rpm or 30 to 1500 rpm are available, with a constant speed motor.

Check No. 5 on Reply Card for more Details

Bends Tubes at High Speed

Furnished in several sizes for bending up to and including 3 inch OD ¼-inch wall or larger tubes of the same area is a high speed hydraulic automatic bending machine



manufactured by Acme-Winter Corp., Buffalo 13, N. Y. The short bending head allows the operator to work in front of the machine. Stand-

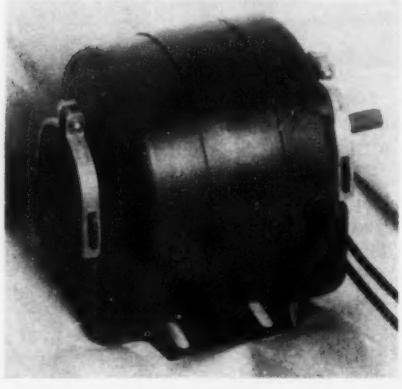
ard models are equipped with six automatic stops for various degree of bends and are indexed automatically.

Machine bends either right or left hand with the standard dies and can be furnished with hand control and automatic mandrel ejector. They may be furnished with special extension table and adjustable gages to suit customers' needs. Motor and oil tank are in the base or pan. Bending head is made of cast steel and is fitted with needle bearings. Operation is by rack and pinion.

Check No. 6 on Reply Card for more Details

All-Angle Operations Motors

Line of lifetime oil-lubricated, shaded-pole motors for operation with shaft up, down, horizontal or at any intermediate angle are being announced by General Electric Co., Schenectady 5, N. Y. The type KSP motors with frame sizes 11 and 21 may be used as drives for exhaust



and cooling fans, condenser cooling and for small pumps, agitators and blowers.

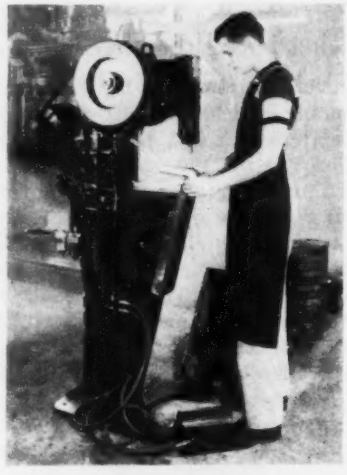
They are available in either open or totally-enclosed construction and in ratings from 1/40-hp through 1/12-hp at 115 or 230 v, 1050 or 1550 rpm, 60 cycles. Lubrication system provides a constant flow of oil from a large reservoir to the bearing surfaces regardless of motor position.

Check No. 7 on Reply Card for more Details

Machine Sets Nuts in Bracket

Using the underfeed Clinchor machine, developed by Tompkins-Johnson Co., Jackson, Mich., standard square neck cased nuts are automatically fed and set in metal brackets or other parts. Floating type cased nuts and various sizes of Fabri-Steel nuts may also be handled. Flange of encased nuts, before being set, protrudes through the square hole in the part which the operator has placed in the machine's anvil. Operation is by foot pedal.

When one nut is set, the underfeed mechanism reloads the anvil for the next operation. Underfeed machine is available in a standard model with vertical anvil and anvil guide and a special model with inclined anvil and anvil guide for setting nuts in parts

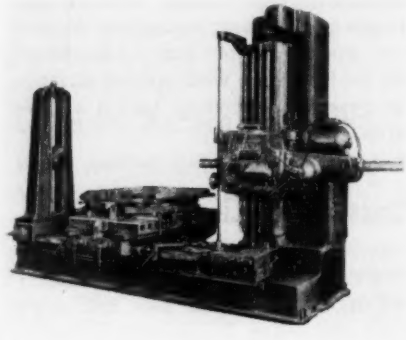


that could not be handled because of restricted clearances on the parts. Operator loads nuts into a hopper which feeds them to the anvil. Capacity of the standard machine is 9/16 to 3/4-inch OD D-type clinch nuts, 17/32 to 29/32-inch square case type clinch nuts and extruded type clinch nuts. Throat depths range from 8 to 36 inches.

Check No. 8 on Reply Card for more Details

Miller Has Rotary Table

An integral part of the horizontal boring, drilling and milling machine introduced by Cincinnati Gilbert Machine Tool Co., Cincinnati 23, O., is a rotary table unit which has a cross



feed and power rapid traverse on its saddle. Table top is clamped to its base by a 47-inch diameter ring clamp acting on an angular surface of the table top. Flat ways are lubricated by a pressure system, making it easy to revolve the table top by hand with heavy loads upon it.

Table top has a working surface 44 inches square. Other features of the machine include a single hardened 2½-inch diameter spindle with maximum spindle speeds of 1420 rpm, built-in reversing motor and centralized control for all spindle speeds, feed changes and feed selection.

Check No. 9 on Reply Card for more Details

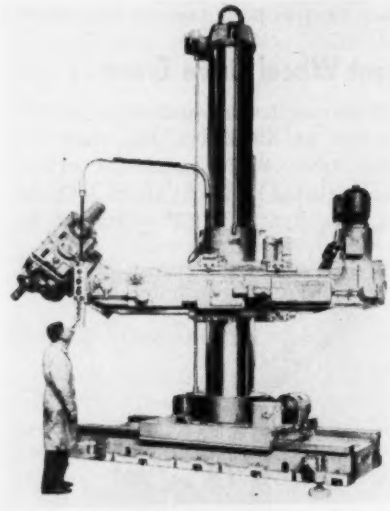
Light Weight Belt Conveyor

An aluminum power belt conveyor, weighing 150 pounds and requiring 3 sq ft of storage space, is offered by Arrow Products Inc., 417 Front Ave. NW., Grand Rapids, Mich. It operates equally well horizontally and in inclined positions and is easily moved by one man. Conveyor is offered in 8 and 10-foot lengths for all types of package, carton and bundle carrying and can be coupled to Arr-O-Lite gravity conveyors.

Check No. 10 on Reply Card for more Details

Drilling and Tapping Machine

Holes may be drilled at any point in a range from 18 to 134 inches above the floor with the spindle in a horizontal position on the heavy duty full-universal drilling and tapping machine available from Kaukauna Machine Corp., Kaukauna, Wis. It



provides 97-inch radial reach with the spindle in vertical position and is capable of performing all radial, horizontal or angular operations such as drilling, tapping, boring, spotfacing or reaming on a production basis. The spindle, with 18 inches of manual and power feed, has nine speeds in a choice of three ranges from a minimum of 25 to a maximum of 800 rpm.

Spindle drive power range is from 10 to 20 hp and spindle head swivels 360 degrees on the trunnion and the trunnion rotates 180 degrees on the rails. Entire rail unit, carrying the spindle head, spindle drive and trans-

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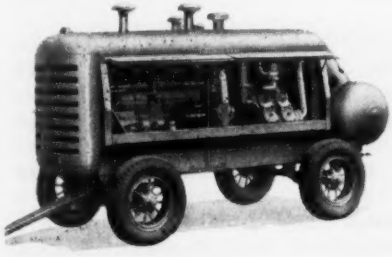
mission, is provided with 60 inches of vertical movement on the column with power rapid traverse up and down. Column base is on a runway which provides 48 inches of horizontal movement with both power rapid traverse and inching in either direction.

Check No. 11 on Reply Card for more Details

Compressor is Diesel-Driven

Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y., is introducing a full diesel engine drive portable air compressor, the Mobil-Air, of 500 cfm size. Driven by an International-Harvester heavy duty engine which starts as a low-compression gasoline-engine and after a short warmup



period is shifted to full diesel operation, the IKA-500 compressor delivers air at 100 psi.

A floating speed regulator slows down the compressor to the lowest practical working speed to compress enough air to hold the pressure. Other features include two-stage air-cooled compressor, Hydro-Shift, Flex-Disc clutch, channel valves and easily cleaned air cleaner.

Check No. 12 on Reply Card for more Details

• • •

PREVENTS SLIPPING: Alan Wood Steel Co., Conshohocken, Pa., announces A. W. Algrip, a new, non-skid floor plate, for use on industrial floors, loading platforms, ramps, etc. These plates combine abrasive grain and rolled steel. They are available in thicknesses from ⅛ to ⅜-inch inclusive and in widths up to 60 inches maximum, by 144 inches long.

Check No. 13 on Reply Card for more Details

FOR SPOT CHECKING: Fabricated plastic or nonferrous metal parts can be rapidly tested with the Impressor, a new hardness tester offered by Barber-Colman Co., Rockford, Ill. Suitable for spot checking, it can be used in any position.

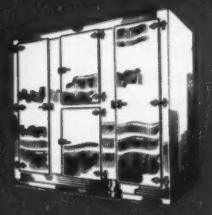
Check No. 14 on Reply Card for more Details

RESISTORS FOR LOW WATTAGE: Bulletin 35 Edgeohm high current resistors, made by Ward Leonard Elec-

HOW TO MAKE GOOD PRODUCTS BETTER AT NO EXTRA COST...

with PERMACLAD
STAINLESS CLAD STEEL

Truly corrosion resistant!
Easily formed or deep drawn!



Wherever you use PERMACLAD, products take on new gleaming beauty and corrosion resistance. And costs go down!

Reason: PERMACLAD combines the surface characteristics of stainless steel and the easy forming qualities of mild carbon steel. You can cold-form PERMACLAD with ease—subject it to deeper draws—form it into products impossible with certain other corrosion resistant materials! Percentage of stainless steel inseparably welded to mild steel backing is usually 10% or 20% but this can be increased or decreased to suit your requirements. Permaclad is as modern as your newest designs—as versatile as you want it to be.

All sorts of products, from chemical vessels and vats to children's sliding boards, are now being made from PERMACLAD. For better products at lower costs, get full details today. Write for free folder P-18.

Alan Wood Steel Company, Conshohocken, Penna.

The Finer The Finish The Finer The Product For The Finest Finish Use PERMACLAD

PERMACLAD
STAINLESS CLAD STEEL

A Product of ALAN WOOD STEEL COMPANY

OTHER PRODUCTS

tric Co., Mount Vernon, N. Y., are now available in four shorter lengths —6, 9¼, 12½ and 15¾ inches— which permit their use in lower wattage applications. Minimum resistance value per unit is extended from 0.35 to 0.05 ohms. Continuous current capacities range from 21 to 79 amp for all sizes.

Check No. 15 on Reply Card for more Details

APPLIED BY BRUSH OR SPRAY: Brooklyn Varnish Mfg. Co., Brooklyn 1, N. Y., announces Tuf-On Speedtuf varnish, made with phenolic resins and tung oil. It meets all requirements of a finish for vulcanized fiber. It may be applied by brush or spray and dries in an hour to a lustrous coating.

Check No. 16 on Reply Card for more Details

FOR PATCHING FLOORS: A new plastic type floor material, designated as Swift-Floor, is offered by Monroe Co., Inc., Cleveland 6, O. It can be used for patching wood or concrete floors or for complete resurfacing. It is set by compression and floor can be used 1 minute after application.

Check No. 17 on Reply Card for more Details

PROVIDE VENTILATING AND COOLING AIR: Portable ventilators, introduced by Mine Safety Appliances Co., Pittsburgh 8, Pa., are equipped with high velocity fans powered by either gasoline or electricity and provide both ventilating and cooling air.

Check No. 18 on Reply Card for more Details

PREVENTS LOAD SHIFTING: Sage Equipment Co., Buffalo 13, N. Y., announces a new automatic gluer in 12, 14 and 18-inch widths. Guard rails and two glue wheels are completely adjustable.

Check No. 19 on Reply Card for more Details

VISIBLE OIL GAGE: Combination oil cups and oil gages, offered by Trico Fuse Mfg. Co., Milwaukee 12, Wis., can be used as a visible oil cup to replenish oil in bearings, transmission and crankshaft cases, etc., and also as an oil gage to check oil levels periodically. Available in 1, 2, 4 and 8-ounce capacities.

Check No. 20 on Reply Card for more Details

PROPORTIONING TYPE VALVE: An atomizing valve for use on deaerating heaters, vacuum deaerators and hot process softeners is announced by Belco Industrial Equipment Division Inc., Paterson 3, N. J. It is a proportioning type, insuring uniform atomization under all varying load conditions. It is nonclogging and designed to provide a tangential spraying action and atomization of incoming water to droplet form. Available in all capacity ranges up to 2000 gallons per minute.

Check No. 21 on Reply Card for more Details

FOR FAST HANDLING: Designed for intraplant shipment of semi-processed and finished parts are the pallet boxes made by Fab-Weld Corp., Philadelphia 34, Pa. Designated as Return-O-Tainer, they have positive locking, hinged sides that fold flat for return or storage. Boxes are all steel, completely welded.

Check No. 22 on Reply Card for more Details

REMOVES DRAWING COMPOUNDS: Development of Chemclean No. 133, a new di-phase cleaner, is announced by Chemclean Products Corp., New York 13, N. Y. It removes buffing and drawing compounds, oils, greases, etc., and eliminates all hand operations. It can be used in conjunction with a vapor degreaser.

Check No. 23 on Reply Card for more Details

ELIMINATES WASTE PACKING: For lubricating journals on overhead cranes and similar equipment, Miller Felpax Corp., Winona, Minn., offers a new lubricator that eliminates waste packing. It consists of nonglazing felt wicks attached to a holder which keeps the wicks in place with correct pressure against the axle to provide full and constant lubrication to bearings and thrust flanges at all times.

Check No. 24 on Reply Card for more Details

INCREASE WEAR LIFE: Newly developed Colmonoy centerless grinder work rest blade tips increase wear life and reduce breakage on centerless grinder applications. Colmonoy tips can be silver soldered to blades now in use. Available from Diamonds & Tools Inc., Detroit 3, Mich.

Check No. 25 on Reply Card for more Details

MAKES POSITIVE COPY: Known as Kodagraph Autopositive film, a new direct-positive film for making reproductions of engineering and architectural drawings and maps has been developed by Eastman Kodak Co., Rochester 4, N. Y. Film may be handled in normal room light and produces a positive copy directly from a positive original drawing, without a negative step. Film is available in 30 and 100 foot rolls in 24, 30, 36, 42 and 44-inch widths.

Check No. 26 on Reply Card for more Details

ALL-PURPOSE COOLANT BASE: Safco 770 compound, developed by Swan-Finch Oil Corp., New York 20, N. Y., has the consistency of a liquid paste and combines in a single water-soluble product all essential qualities of a grinding compound and sulphurized cutting oil. In grinding operations it will prevent wheel-loading, reduce wheel dressings, keep work from rusting. In machining, it has same fine lubricating and antiweld properties of sulphurized oils.

Check No. 27 on Reply Card for more Details

SHELVING ACCESSORIES: General Fireproofing Co., Youngstown, O., introduces new shelving accessories. Among these are: Pipe brackets made of 3/16 x 7/8-inch bar, will take ½-inch standard pipe; sloped boxes for storage of small parts; snap-on label holders made to take labels 1 3/16 inches high by 3½ inches long; bumper posts; gusset sway braces.

Check No. 28 on Reply Card for more Details

FORMS LEAK-PROOF SEAL: For use on lines conveying both liquids and gases and where pressures and temperatures do not exceed 3000 psi and 225° F, is the ball bearing swivel joint made by Chiksan Co., Brea, Calif. The packing unit, which is compounded from Hycar rubber, a product of B. F. Goodrich Chemical Co., forms a leak-proof seal between metal parts.

Check No. 29 on Reply Card for more Details

MECHANICAL GRABBING FINGERS: Yale & Towne Mfg. Co., Philadelphia, Pa., announces a Worksaver development which equips tilting fork models of the battery-powered hand truck line with hydraulically operated fingers which grasp and pick up drums, cylindrical cardboard containers and kegs without the use of pallets or skids.

Check No. 30 on Reply Card for more Details

HANDLES AIR, WATER, OILS: Model 1044 valve, made by Crescent Valve Co., Huntington Park, Calif., may be operated continuously at any cycling speed up to 600 cycles per minute. This four-way, pilot operated, solenoid controlled valve will handle air, water and light oils. It is available in two types: One for operation on line pressures from 0 to 50 psi; the other for operation on line pressures from 30 to 150 psi.

Check No. 31 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

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Market Summary

BRISK steel market through first half of 1950 is in prospect. Some products will be in short supply the next three to four months, principally sheets and strip, giving rise to some conversion and gray market business. Higher prices loom, one medium sized producer last week raising prices $5 per ton on hot-rolled strip and semifinished steel. Supply conditions are expected to be more acute in the Midwest than elsewhere. But a note of caution prevails in metalworking circles. New buying is leveling off; only in flat-rolled items is a strong surge continuing. Steelmakers are concerned over demand prospects in the heavy industries, but view the automotive outlook as promising. However, some uncertainty prevails here too and developments are being watched closely. Many auto shops are closing for steel inventory replenishment. In a number of other lines, notably farm implements, operations are curtailed, pending rebuilding of steel stocks.

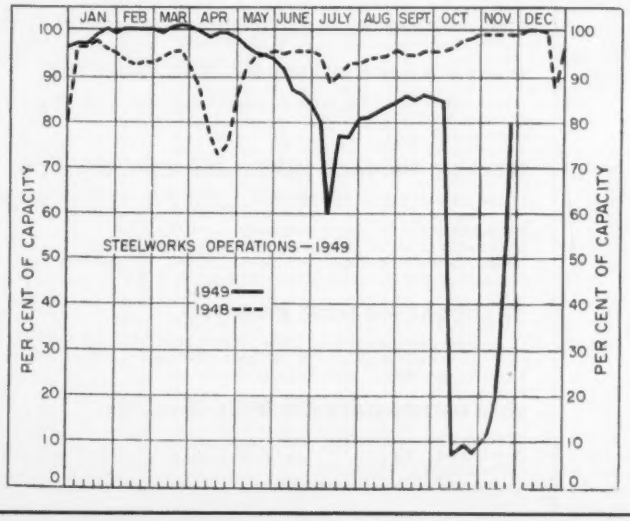
PRODUCTION—Steelmaking operations are recovering rapidly from the strike suspension. Last week the national ingot rate rose another 24 points to 80 per cent of capacity. The prestrike rate of 85 per cent is expected to be topped before this weekend.

SUPPLY—Steelmakers are under pressure for shipments from all directions. Fabricators and warehouses are seeking to replenish stocks as quickly as possible. Expectations are that supply will begin to catch up with demand in most products in a few weeks, possibly before year-end. In flat-rolled, outstanding exception in this regard, it will be late first quarter at earliest before any easing in pressure is likely. Most sheet sellers are sold out through first quarter, and several through first half. Most products are expected to be in progressively easier supply as the finishing mills regain prestrike operating levels and mill shipments resume normal pace. Last week Midwest shipments were interfered with slightly by a truck haulers' strike.

DEMAND—New buying is noticeably slower. Plate producers are reaching into distant areas for orders, absorbing freight where necessary. Most sellers can give deliveries in three to five weeks. Carbon bar sales are leveling off as the flow of tonnage from the mills mounts. Mill shipments on bars average four to five weeks. Forging manufacturers, cold-finishers and the warehouses are specifying actively. There is less all-around pressure evident.

PRICES— Market attention will be riveted on price developments from here on. One medium sized Pittsburgh district producer advanced prices $5 per ton on hot-rolled strip and semifinished steel. This is interpreted as showing the way the wind is blowing, but it is not believed any general advance will come before first quarter. Consumers indicate they will resist increases. Producers' policy will likely depend on competitive conditions and business prospects. Meanwhile, some high-priced conversion steel has been placed but consumers generally are expected to move slowly in entering this market. In some quarters the thought is expressed that conversion steel buyers may have acted too hastily in ordering. Gray market offerings are appearing above warehouse price levels but the volume of business going is not imposing. Significantly, some of the zip appears to have gone from the scrap market.

COMPOSITES—STEEL's weighted index of finished steel prices held unchanged last week at 152.52 and compared with 151.86 a year ago. The arithmetical composite held steady at $91.64. Scrap was slightly easier in some districts, the price composite on steelmaking grades declining to $29.83 from $30. Composites on pig iron follow: No. 2 foundry iron, $46.10; malleable, $47.27; and basic, $45.60.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Nov. 26	Change	Same Week 1948	Same Week 1947
Pittsburgh	73	+30	96.5	102
Chicago	75	+30*	98.5	95
Eastern Pa.	80	+ 0.5	95	93.5
Youngstown	90	+40	105	100
Wheeling	99	+21	95.5	86
Cleveland	90.5	+17.5*	96.5	93.5
Buffalo	101	None	104	88.5
Birmingham	62	+37	100	103
New England	87	+14	90	87
Cincinnati	60	+ 4	103	87
St. Louis	87	— 4.5	84.5	78
Detroit	101	+22	99	92
Western	71	+13	..	..
Estimated national rate	80	+24	99	96.5

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947. *Change from revised rate.

News Summary—P. 25 *Engineering News—P. 55*

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Composite Market Averages

	Nov. 23 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	152.52	152.52	152.52	151.86	99.16
Index in cents per lb ..	4.132	4.132	4.132	4.114	2.686
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$91.64	$91.64	$91.64	$95.50	$56.73
No. 2 Fdry Pig Iron, GT	46.10	46.10	46.10	46.69	23.67
Malleable Pig Iron, GT..	47.27	47.27	47.27	47.41	24.29
Basic Pig Iron, GT.....	45.60	45.60	45.60	46.29	23.00
Steelmaking Scrap, GT..	29.83	30.00	26.67	43.25	16.83

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Nov. 23 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh ...	3.35	3.35	3.35	3.35-55	2.15
Bars, H.R., del. Phila. ...	3.83	3.83	3.83	3.79	2.47
Bars, H.R., Chicago	3.35	3.35	3.35	3.35	2.15
Bars, C. F., Pittsburgh ...	3.95-4.00	3.95-4.00	3.95-4.00	3.95-4.25	2.65
Bars, C. F., Chicago	4.00	4.00	4.00	4.00	2.65
Shapes, Std., Pittsburgh ..	3.25	3.25	3.25	3.25-30	2.10
Shapes, Std., Chicago	3.25	3.25	3.25	3.25	2.10
Shapes, del. Phila.	3.50	3.50	3.50	3.48	2.215
Plates, Pittsburgh	3.40	3.40	3.40	3.40-60	2.10
Plates, Chicago	3.40	3.40	3.40	3.40	2.10
Plates, Coatesville, Pa. ..	3.50	3.50	3.50	3.75	2.10
Plates, Sparrows Point, Md.	3.40	3.40	3.40	3.45	2.10
Plates, Claymont, Del.	3.50	3.50	3.50	3.95	2.10
Plates, del. Phila.	3.59	3.59	3.59	3.71	2.15
Sheets, H.R., Pittsburgh ..	3.25	3.25	3.25	3.25-30	2.10
Sheets, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Sheets, C.R., Pittsburgh ..	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Chicago	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Detroit	4.20	4.20	4.20	4.20	3.15
Sheets, Galv., Pittsburgh ..	4.40	4.40	4.40	4.40	3.50
Strip, H.R., Pittsburgh ...	3.25	3.25	3.25	3.25-70	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25-30	2.10
Strip, C.R., Pittsburgh...	4.00	4.00	4.00	4.00-75	2.80
Strip, C.R., Chicago	4.00-15	4.00-15	4.00-15	4.00-25	2.90
Strip, C.R., Detroit	4.20-25	4.20-25	4.20-25	4.20-50	2.90
Wire, Basic, Pittsburgh ...	4.15	4.15	4.15	4.15-4.50	2.60
Nails, Wire, Pittsburgh ...	5.15	5.15	5.15	5.15-6.30	2.55
Tin plate, box, Pittsburgh.	$7.75	$7.75	$7.75	$6.70	$5.00

SEMIFINISHED

Billets, forging, Pitts.(NT)	$61.00	$61.00	$61.00	$61.00	$40.00
Sheet bar, mill(NT)	51.78–57.00	51.78–52.00	51.78–52.00	67.00	34.00
Wire rods, $\frac{7}{32}$-$\frac{3}{8}$", Pitts. ..	3.40	3.40	3.40	3.40-4.15	2.00

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$24.50
Basic, Valley	46.00	46.00	46.00	46.00	23.50
Basic, del. Phila.	49.44	49.44	49.44	50.17	25.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.00-46.50	24.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, del. Phila. ...	49.94	49.94	49.94	50.67	25.84
No. 2 Fdry, Birmingham ..	39.38	39.38	39.38	43.38	20.38
No. 2 Fdry.(Birm.)del Cin.	46.08	46.08	46.08	49.09	24.06
Malleable, Valley	46.50	46.50	46.50	46.50	24.00
Malleable, Chicago	46.50	46.50	46.50	46.50	24.00
Charcoal, Lyles, Tenn.	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	163.00	135.00*

* Delivered, duty paid.

SCRAP, Gross Ton

No. 1 Heavy Melt, Pitts. ..	$33.50	$33.00	$29.00	$42.75	$18.50
No. 1 Heavy Melt, E. Pa. .	26.50	26.50	24.00	45.25	15.50
No. 1 Heavy Melt, Chicago.	29.50	30.50	27.50	41.75	16.50
No. 1 Heavy Melt, Valley..	32.75	32.75	29.25	42.75	17.25
No. 1 Heavy Melt, Cleve...	30.25	30.25	25.75	42.25	15.25
No. 1 Heavy Melt, Buffalo.	29.75	29.75	27.25	48.50	17.00
Rails, Rerolling, Chicago..	44.50	44.50	41.50	70.50	22.25
No. 1 Cast, Chicago	42.50	42.50	41.50	70.50	20.00

COKE, Gross Ton

Beehive, Furn., Connlsvl. .	$13.25	$13.25	$13.25	$14.50	$7.00
Beehive, Fdry., Connlsvl. .	15.75	15.75	15.75	17.00	7.75
Oven Fdry, Chicago	20.00	20.00	20.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	18.50	18.50	17.625	23.50	12.00
Zinc, E. St. Louis	9.75	9.75	9.25	17.50	8.25
Lead, St. Louis	11.80	12.30	12.80	21.30-35	6.35
Tin, New York.....	85.00	92.00	95.75	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	17.00	15.00
Antimony, Laredo, Tex. ..	32.00	32.00	38.50	38.50	14.50
Nickel, refinery, duty paid.	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark,del.	50.63	51.13	51.63	52.13
Brooklyn,N.Y.,del.	....	52.79	53.29	....
Birmingham District				
Birmingham,Ala. R2, S9	38.88	39.38	....	....
Woodward,Ala. W15	38.88	39.38	....	....
Cincinnati,del.	....	46.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda,N.Y. W12	46.00	46.50	47.00	....
N.Tonawanda,N.Y. T9	....	46.50	47.00	....
Boston,del.	55.26	55.76	56.20	....
Rochester,N.Y.,del.	48.63	49.13	49.63	....
Syracuse,N.Y.,del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary,Ind. C3	46.00	....	46.50	....
IndianaHarbor,Ind. I-2	46.00	....	46.50	....
So.Chicago,Ill. W14	46.00	46.50	46.50	....
So.Chicago,Ill. C3	46.00	....	46.50	47.00
So.Chicago,Ill. Y1	46.00	46.50	46.50	....
Milwaukee,del.	47.89	48.39	48.39	48.89
Muskegon,Mich,del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron, del. from Cleve.	48.39	48.89	48.89	49.39
Lorain,O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie,Pa. I-3	46.00	46.50	46.50	47.00
Everett,Mass. E1	....	50.50	51.00	....
Geneva,Utah G1	46.00	46.50	....	....
Seattle,Tacoma,Wash.,del.	....	54.20	....	....
Portland,Oreg.,del.	....	54.20	....	....
LosAngeles,SanFrancisco,del.	53.70	54.20	....	....
GraniteCity,Ill. M10	47.90	48.40	48.90	....
St.Louis,del.(incl. tax)	48.65	49.15	49.65	....
Ironton,Utah C11	46.00	46.50	....	....
Minnequa,Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
NevilleIsland,Pa. P6	46.00	46.50	46.50	47.00
Pitts.N.&S. sides,Ambridge, Aliquippa,del.	47.19	47.69	47.69	48.19
McKeesRocks,del.	46.95	47.45	47.45	47.95
Lawrenceville,Homestead, McKeesport,Monaca,del.	47.44	47.94	47.94	48.44
Verona,del.	47.90	48.40	48.40	48.90
Brackenridge,del.	48.13	48.63	48.63	49.13
Bessemer,Pa. C3	46.00	....	46.50	47.00
Clairton,Rankin,So.Duquesne,Pa. C3	46.00	....	....	....
McKeesport,Pa. N3	46.00	....	....	47.00
Sharpsville,Pa. S6	46.00	46.50	46.50	47.00
Steelton,Pa. B2	48.00	48.50	49.00	49.50
Steubenville,O. W10	46.00	....	....	....
Struthers,O. S16	46.00	....	....	....
Swedeland,Pa. A3	48.00	48.50	49.00	49.50
Philadelphia,del.	49.44	49.94	50.44	50.94
Toledo,O. I-3	46.00	46.50	46.50	47.00
Cincinnati,del.	51.01	51.51	....	....
Troy,N.Y. R2	48.00	48.50	49.00	....
Youngstown District				
Hubbard,O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield,O.,del.	50.26	50.76	50.76	51.26

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; Add $1 for each 0.5% Si to 11.50%)

Jackson,O. J1, G2	$59.50
Buffalo H1	60.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls,N.Y. P15	$71.50
Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk,Iowa, OH & Fdry., 12½ lb. piglets, frt. allowed K2..	82.00
Wenatchee,Wash. OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos, semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$60.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton,Pa. B2	54.00
Philadelphia delivered	57.09
Troy,N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL Nov. 23, 1949; cents per pound unless otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)

Detroit R7 ..... $50.00
Munhall,Pa. C3 ..... 50.00

INGOTS, Alloy (NT)

Detroit R7 ..... $51.00
Houston,Tex. S5 ..... 59.00
Midland,Pa. C18 ..... 51.00
Munhall,Pa. C3 ..... 51.00
So.Duquesne,Pa. C3 ... 51.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Bessemer,Pa. C3 ..... $52.00
Clairton,Pa. C3 ..... 52.00
Conshohocken,Pa. A3 .. 57.00
Ensley,Ala. T2 ..... 52.00
Fairfield,Ala. T2 ..... 52.00
Fontana,Calif. K1 ..... 71.00
Gary,Ind. C3 ..... 52.00
Johnstown,Pa. B2 ..... 52.00
Lackawanna,N.Y. B2 .. 52.00
Munhall,Pa. C3 ..... 52.00
Sharon,Pa. S3 ..... 57.00
So.Chicago,Ill. C3 .... 52.00
So.Duquesne,Pa. C3 ... 52.00

Carbon, Forging (NT)

Bessemer,Pa. C3 ..... $61.00
Buffalo R2 ..... 61.00
Canton,O. R2 ..... 61.00
Clairton,Pa. C3 ..... 61.00
Cleveland R2 ..... 61.00
Conshohocken,Pa. A3 .. 63.00
Detroit R7 ..... 61.00
Ensley,Ala. T2 ..... 61.00
Fairfield,Ala. T2 ..... 61.00
Fontana,Calif. K1 .... 80.00
Gary,Ind. C3 ..... 61.00
Geneva,Utah G1 ..... 61.00
Houston,Tex. S5 ..... 69.00
Ind.Harbor,Ind. I-2 .... 61.00
Johnstown,Pa. B2 ..... 61.00
Lackawanna,N.Y. B2 .. 61.00
Munhall,Pa. C3 ..... 61.00
So.Duquesne,Pa. C3 ... 61.00
So.Chicago,Ill. C3, R2.. 61.00
Warren,O. C17 ..... 61.00

Alloy (NT)

Bethlehem,Pa. B2 .... $63.00
Buffalo R2 ..... 63.00
Canton,O. R2, T7..... 63.00
Conshohocken,Pa. A3 .. 65.00
Detroit R7 ..... 63.00
Fontana,Calif. K1 .... 82.00
Gary,Ind. C3 ..... 63.00
Houston,Tex. S5 ..... 71.00
Johnstown,Pa. B2 .... 63.00
Lackawanna,N.Y. B2 .. 63.00
Massillon,O. R2 ..... 63.00
Midland,Pa. C18 ..... 63.00
Munhall,Pa. C3 ..... 63.00
Sharon,Pa. S3 ..... 63.00
So.Chicago,Ill. C3, R2.. 63.00
So.Duquesne,Pa. C3 ... 63.00
Warren,O. C17 ..... 63.00

SHEET BARS (NT)

Mansfield,O. E6..(GT) $58.00
Portsmouth,O. P12 .... 52.00
Sharon,Pa. S3 ..... 57.00

ROUNDS, SEAMLESS TUBE (NT)

Canton,O. R2 ..... $76.00
Cleveland R2 ..... 76.00
Ind.Harbor,Ind. I-2 .... 76.00
Massillon,O. R2 ..... 76.00
So.Chicago,Ill. R2 .... 76.00

SKELP

Aliquippa,Pa. J5 ..... 3.25
Munhall,Pa. C3 ..... 3.25
Warren,O. R2 ..... 3.25
Youngstown C3, R2 .... 3.25

WIRE RODS

AlabamaCity,Ala. R2 .. 3.40
Buffalo W12 ..... 3.40
Cleveland A7 ..... 3.40
Donora,Pa. A7 ..... 3.40
Fairfield,Ala. T2 ..... 3.40
Houston,Tex. S5 ..... 3.95
Ind.Harbor,Ind. Y1 .... 3.40
Johnstown,Pa. B2 ..... 3.40
Joliet,Ill. A7 ..... 3.40
LosAngeles B3 ..... 4.20
Monessen,Pa. P7 ..... 3.40
Pittsburg,Calif. C11 .... 4.05
Portsmouth,O. P12 .... 3.40
So.Chicago,Ill. R2 .... 3.40
SparrowsPoint B2 ..... 3.50
Sterling,Ill.(1) N15 .... 3.40
Struthers,O. Y1 ..... 3.40
Torrance,Calif. C11 .... 4.20
Worcester,Mass. A7 .... 3.70

STRUCTURALS
Wide Flange

Bethlehem,Pa. B2 ..... 3.30
Lackawanna,N.Y. B2 .. 3.30
Munhall,Pa. C3 ..... 3.20
So.Chicago,Ill. C3 ..... 3.20

H.-S. Low-Alloy

Aliquippa,Pa. J5 ..... 4.95
Bessemer,Ala. T2 ..... 4.95
Bethlehem,Pa.(14) B2 .. 5.05
Clairton,Pa. C3 ..... 4.95
Fairfield,Ala. T2 ..... 4.95
Fontana,Calif. K1 ..... 6.10
Gary,Ind. C3 ..... 4.95
Ind.Harbor,Ind. I-2, Y1. 4.95
Johnstown,Pa. B2 ..... 5.05
Lackawna,N.Y.(14) B2 .. 5.05
Munhall,Pa.(14) C3 .... 4.95
So.Chicago,Ill.(14) C3 .. 4.95
Struthers,O. Y1 ..... 4.95

Carbon Steel Stand. Shapes

Aliquippa,Pa. J5 ..... 3.25
Bessemer,Ala. T2 ..... 3.25
Bethlehem,Pa. B2 ..... 3.30
Clairton,Pa. C3 ..... 3.25
Fairfield,Ala. T2 ..... 3.25
Fontana,Calif. K1 ..... 3.80
Gary,Ind. C3 ..... 3.25
Geneva,Utah G1 ..... 3.25
Houston,Tex. S5 ..... 3.65
Ind.Harbor,Ind. I-2 .... 3.25
Johnstown,Pa. B2 ..... 3.30
KansasCity,Mo. S5 .... 3.85
Lackawanna,N.Y. B2 .. 3.30
LosAngeles B3 ..... 3.85
Minnequa,Colo. C10 .... 3.75
Munhall,Pa. C3 ..... 3.25
Niles,Calif.(22) P1 .... 3.97
Portland,Oreg. O4 ..... 3.90
Seattle B3 ..... 3.90
So.Chicago,Ill. C3, W14 .3.25
So.SanFrancisco B3 .... 3.80
Torrance,Calif. C11 .... 3.85
Weirton,W.Va. W6 ..... 3.25

Alloy Stand. Shapes

Clairton,Pa. C3 ..... 4.05
Fontana,Calif. K1 ..... 5.25
Munhall,Pa. C3 ..... 4.05
So.Chicago,Ill. C3 ..... 4.05

SHEET STEEL PILING

Ind.Harbor,Ind. I-2 .... 4.05
Lackawanna,N.Y. B2 .... 4.05
Munhall,Pa. C3 ..... 4.05
So.Chicago,Ill. C3 ..... 4.05
Weirton,W.Va. W6 ..... 4.05

PLATES, Carbon Steel

AlabamaCity,Ala. R2 .. 3.40
Aliquippa,Pa. J5 ..... 3.40
Ashland,Ky.(15) A10 .... 3.40
Bessemer,Ala. T2 ..... 3.40
Clairton,Pa. C3 ..... 3.40
Claymont,Del. W16 .... 3.50
Cleveland J5, R2 ..... 3.40
Coatesville,Pa. L7 ..... 3.50
Conshohocken,Pa. A3 ... 3.50
Ecorse,Mich. G5 ..... 3.65
Fairfield,Ala. T2 ..... 3.40
Fontana,Calif. K1 ..... 4.00
Gary,Ind. C3 ..... 3.40
Geneva,Utah G1 ..... 3.40
Harrisburg,Pa. C5 ..... 3.75
Houston,Tex. S5 ..... 3.80
Ind.Harbor,Ind. I-2, Y1. 3.40
Johnstown,Pa. B2 ..... 3.40
Lackawanna,N.Y. B2 .. 3.40
Minnequa,Colo. C10 .... 4.30
Munhall,Pa. C3 ..... 3.40
Pittsburgh J5 ..... 3.40
Seattle B3 ..... 4.30
Sharon,Pa. S3 ..... 3.40
So.Chicago,Ill. C3, W14 .3.40
SparrowsPoint,Md. B2 .. 3.40
Steubenville,O. W10 .... 3.40
Warren,O. R2 ..... 3.40
Weirton,W.Va. W6 ..... 3.40
Youngstown C3, Y1 .... 3.40

PLATES (Universal Mill)

Fontana,Calif. K1 ..... 4.30

PLATES, Open-Hearth Alloy

Coatesville,Pa. L7 ..... 4.50
Conshohocken,Pa. A3 .. 4.40
Fontana,Calif. K1 ..... 5.40
Gary,Ind. C3 ..... 4.40
Johnstown,Pa. B2 ..... 4.40
Munhall,Pa. C3 ..... 4.40
Sharon,Pa. S3 ..... 4.40
So.Chicago,Ill. C3 ..... 4.40
SparrowsPoint,Md. B2 .. 4.40

PLATES, Ingot Iron

Ashland,cl(15) A10 .... 3.65
Ashland,lcl(15) A10 .... 4.15
Cleveland,cl R2 ..... 3.65
Warren,O.,cl R2 ..... 3.65

PLATES, Wrought Iron

Economy,Pa. B14 ..... 7.85

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 5.20
Bessemer,Ala. T2 ..... 5.20
Clairton,Pa. C3 ..... 5.20
Cleveland J5, R2 ..... 5.20
Conshohocken,Pa. A3 .. 5.20
Ecorse,Mich. G5 ..... 5.45
Fairfield,Ala. T2 ..... 5.20
Fontana,Calif. K1 ..... 5.80
Gary,Ind. C3 ..... 5.20
Geneva,Utah G1 ..... 5.20
Houston,Tex. S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1. 5.20
Johnstown,Pa. B2 ..... 5.20
Munhall,Pa. C3 ..... 5.20
Pittsburgh J5 ..... 5.20
Sharon,Pa. S3 ..... 5.65
So.Chicago,Ill. C3 ..... 5.20
SparrowsPoint,Md. B2 .. 5.20
Warren,O. R2 ..... 5.20
Youngstown Y1 ..... 5.20

FLOOR PLATES

Cleveland J5 ..... 4.55
Conshohocken,Pa. A3 .... 4.55
Harrisburg,Pa. C5 ..... 4.55
Ind.Harbor,Ind. I-2 .... 4.55
Munhall,Pa. C3 ..... 4.55
So.Chicago,Ill. C3 ..... 4.55

BARS, Hot-Rolled Carbon

AlabamaCity,Ala. R2 ... 3.35
Aliquippa,Pa. J5 ..... 3.35
Alton,Ill.(1) L1 ..... 3.35
Ashland,Ky. (17) A10 .. 3.35
Atlanta,Ga. A11 ..... 3.50
Bessemer,Ala. T2 ..... 3.35
Buffalo R2 ..... 3.35
Canton,O. R2 ..... 3.35
Clairton,Pa. C3 ..... 3.35
Cleveland R2 ..... 3.35
Ecorse,Mich. G5 ..... 3.55
Emeryville,Calif. J7 .... 4.10
Fairfield,Ala. T2 ..... 3.35
Fontana,Calif. K1 ..... 4.00
Gary,Ind. C3 ..... 3.35
Houston,Tex. S5 ..... 3.75
Ind.Harbor,Ind. I-2, Y1. 3.35
Johnstown,Pa. B2 ..... 3.35
KansasCity,Mo. S5 .... 3.95
Lackawanna,N.Y. B2 .. 3.35
LosAngeles B3 ..... 4.05
Minnequa,Colo. C10 .... 3.85
Niles,Calif. P1 ..... 4.05
N.Tonawanda,N.Y. B11 .3.35
Pittsburg,Calif. C11 .... 4.05
Pittsburgh J5 ..... 3.35
Portland,Oreg. O4 ..... 4.10
Seattle B3, N14 ..... 4.10
S.Chicago C3, R2, W14.. 3.35
So.Duquesne,Pa. C3 .... 3.35
S.SanFran.,Cal. B3 .... 4.10
Struthers,O. Y1 ..... 3.35
Torrance,Calif. C11 .... 4.05
Weirton,W.Va. W6 ..... 3.35
Youngstown C3, R2 .... 3.35

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 ..... 3.35
Atlanta,Ga. A11 ..... 3.50
Bethlehem,Pa.(2) B2 ... 3.55
Johnstown,Pa. B2 ..... 3.35
Lackawanna,N.Y. B2 .. 3.35
Niles,Calif. P1 ..... 4.05
Pittsburgh(23) J5 ..... 3.35
Portland,Oreg. O4 ..... 4.10
SanFrancisco S7 ..... 4.05
Weirton,W.Va. W6 .... 3.35

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ..... 3.75
Buffalo R2 ..... 3.75
Canton,O. R2, T7 ..... 3.75
Clairton,Pa. C3 ..... 3.75
Ecorse,Mich. G5 ..... 4.05
Fontana,Calif. K1 ..... 4.75
Gary,Ind. C3 ..... 3.75
Houston,Tex. S5 ..... 4.15
Ind.Harbor,Ind. I-2, Y1. 3.75
Johnstown,Pa. B2 ..... 3.75
KansasCity,Mo. S5 .... 4.35
Lackawanna,N.Y. B2 .. 3.75
LosAngeles B3 ..... 4.80
Massillon,O. R2 ..... 3.75
Midland,Pa. C18 ..... 3.75
S.Chicago C3, R2, W14.. 3.75
So.Duquesne,Pa. C3 .... 3.75
Struthers,O. Y1 ..... 3.75
Warren,O. C17 ..... 3.75
Youngstown C3 ..... 3.75

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. C3 ..... 4.00
Fontana,Calif. K1 ..... 4.75
Gary,Ind. C3 ..... 4.00
Youngstown C3 ..... 4.00

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 5.10
Bessemer,Ala. T2 ..... 5.10
Bethlehem,Pa. B2 ..... 5.10
Clairton,Pa. C3 ..... 5.10
Cleveland R2 ..... 5.10
Ecorse,Mich. G5 ..... 5.30
Fairfield,Ala. T2 ..... 5.10
Fontana,Calif. K1 ..... 6.15
Gary,Ind. C3 ..... 5.10
Ind.Harbor,Ind. I-2, Y1. 5.10
Johnstown,Pa. B2 ..... 5.10
Lackawanna,N.Y. B2 .. 5.10
Pittsburgh J5 ..... 5.10
So.Duquesne,Pa. C3 .... 5.10
Struthers,O. Y1 ..... 5.10
Youngstown C3 ..... 5.10

BARS, Cold-Finished Carbon

Aliquippa,Pa. K5 ..... 4.00
Ambridge,Pa. W18 ..... 4.00
BeaverFalls, M12, R2... 4.00
Buffalo B5 ..... 4.00
Camden,N.J. P13 ..... 4.48
Carnegie,Pa. C12 ..... 4.00
Chicago W18 ..... 4.00
Cleveland A7, C20 ..... 4.00
Cumberland,Md. C19 ... 3.95
Donora,Pa. A7 ..... 4.00
Ecorse,Mich. G5 ..... 4.30
Elyria,O. W8 ..... 4.00
FranklinPark,Ill. N5 ... 4.00
Gary,Ind. R2 ..... 4.00
Hammond,Ind. L2, M13. 4.00
Hartford,Conn. R2 ..... 4.40
Harvey,Ill. B5 ..... 4.00
Indianapolis M13 ..... 4.20
LosAngeles R2 ..... 5.40
Mansfield,Mass. B5 .... 4.40
Massillon,O. R2, R8.... 4.00
Midland,Pa. C18 ..... 4.00
Monaca,Pa. S17 ..... 4.00
Newark,N.J. W18 ..... 4.40
Plymouth,Mich. P5 ..... 4.25
Pittsburgh J5 ..... 3.95
Putnam,Conn. W18 .... 4.40
Readville,Mass. C14 ... 4.40
St.Louis,Mo. M5 ..... 4.35
So.Chicago,Ill. W14 .... 4.00
SpringCity,Pa.(5) K3 .. 4.48
Struthers,O. Y1 ..... 4.00
Waukegan,Ill. A7 ..... 4.00
Youngstown F3, Y1..... 4.00

BARS, Cold-Finished Alloy

Aliquippa,Pa. K5 ..... 4.65
Ambridge,Pa. W18 ..... 4.65
BeaverFalls,Pa. M12 ... 4.65
Bethlehem,Pa. B2 ..... 4.65
Buffalo B5 ..... 4.65
Canton,O. R2, T7..... 4.65
Carnegie,Pa. C12 ..... 4.65
Chicago W18 ..... 4.65
Cleveland A7, C20 ..... 4.65
Donora,Pa. A7 ..... 4.65
Elyria,O. W8 ..... 4.65
Gary,Ind. R2 ..... 4.65
Hammond,Ind. L2, M13. 4.65
Hartford,Conn. R2 ..... 4.95
Harvey,Ill. B5 ..... 4.65
Indianapolis M13 ..... 4.85
Lackawanna,N.Y. B2 .. 4.65
Mansfield, Mass. B5... 4.95
Massillon,O. R2, R8.... 4.65
Midland,Pa. C18 ..... 4.65
Monaca,Pa. S17 ..... 4.65
Newark,N.J. W18 ..... 4.95
So.Chicago,Ill. R2, W14. 4.65
Struthers,O. Y1 ..... 4.65
Waukegan,Ill. A7 ..... 4.65
Worcester,Mass. A7 .... 4.95
Youngstown F3, Y1..... 4.65

BARS, Reinforcing (Fabricators)

AlabamaCity,Ala. R2 .. 3.35
Alton,Ill.(6) L1 ..... 3.35
Atlanta,Ga. A11 ..... 3.50
Buffalo R2 ..... 3.35
Cleveland R2 ..... 3.35
Emeryville,Calif. J7 .... 4.10
Fairfield,Ala. T2 ..... 3.35
Fontana,Calif. K1 ..... 4.00
Gary,Ind. C3 ..... 3.35
Houston,Tex. S5 ..... 3.75
Ind.Harbor,Ind. I-2, Y1 .3.35
Johnstown,Pa. B2 ..... 3.35
KansasCity, Mo. S5..... 3.95
Lackawanna,N.Y. B2 .. 3.35
LosAngeles B3 ..... 4.05
Minnequa,Colo. C10 .... 4.25
Niles,Calif. P1 ..... 4.05
Pittsburg,Calif. C11 .... 4.05
Pittsburgh J5 ..... 3.35
Portland,Oreg. O4 ..... 4.10
Seattle, Wash. B3, N14.. 4.10
So.Chicago,Ill. R2 ..... 3.35
So.Duquesne,Pa. C3 .... 3.35
So.SanFrancisco B3 .... 4.10
SparrowsPoint,Md. B2.. 3.35
Struthers,O. Y1 ..... 3.35
Torrance,Calif. C11 .... 4.05
Youngstown C3, R2 .... 3.35

BARS, Reinforcing (Fabricated; to Consumers)

Huntington,W.Va. W7 .. 4.50
Johnstown, ¼-1" B2 .... 4.25
LosAngeles B3 ..... 5.00
Marion,O. P11 ..... 4.25
Pittsburgh J5 ..... 4.25
Seattle B3, N14 ..... 5.00
So.SanFrancisco B3 .... 5.00
SparrowsPt., 1⅛-1¼" B2 .4.83
SparrowsPt., ¼-1" B2 .. 4.25

RAIL STEEL BARS

ChicagoHts.,Ill.(3) I-2 .. 3.25
FortWorth,Tex.(4) T4 .. 4.33
Hntngtn,W.Va.(3) W7 .. 3.35
Moline,Ill.(3) R2 ..... 3.35
Williamsport(2,3) S19 .. 3.35
Williamsport(4) S19 ... 3.85

BARS, Wrought Iron

Economy,Pa.(S.R.)B14.. 9.50
Economy,Pa.(D.R.)B14.11.00
Economy(Stabit) B14 .. 11.30
McK.Rks.(S.R.) L5 .... 8.60
McK.Rks.(D.R.) L5 .... 11.25
McK.Rks.(Staybolt) L5.. 12.75

BARS, Hot-Rolled Ingot Iron

Ashland,Ky.(17) A10 ... 3.60

SHEETS, Hot-Rolled Steel (18 gage and heavier)

AlabamaCity,Ala. R2 .. 3.25
Ashland,Ky.(8) A10 .... 3.25
Butler,Pa. A10 ..... 3.25
Cleveland J5, R2 ..... 3.25
Conshohocken,Pa. A3 .. 3.35
Ecorse,Mich.(8) G5 .... 3.45
Fairfield,Ala. T2 ..... 3.25
Fontana,Calif. K1 ..... 4.15
Gary,Ind. C3 ..... 3.25
Ind.Harbor,Ind. I-2, Y1.. 3.25
Irvin,Pa. C3 ..... 3.25
Kokomo,Ind. C16 ..... 3.35
Lackawanna,N.Y. B2 .. 3.25
Munhall,Pa. C3 ..... 3.25
Niles,O. M4 ..... 3.25
Pittsburg,Calif. C11 .... 3.95
Pittsburgh J5 ..... 3.25
Sharon,Pa. S3 ..... 3.25
So.Chicago,Ill. W14 .... 3.25
SparrowsPoint,Md. B2 .. 3.25
Steubenville,O. W10 .... 3.25
Torrance,Calif. C11 .... 3.95
Warren,O. R2 ..... 3.25
Weirton,W.Va. W6 ..... 3.25
Youngstown C3, Y1 .... 3.25

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)

AlabamaCity,Ala. R2 .... 4.40
Dover,O. R1 ..... 5.00
Fairfield,Ala. T2 ..... 4.15
Ind.Harbor,Ind. I-2 .... 4.15
Kokomo,Ind. C16 ..... 4.25
Mansfield,O. E6 ..... 4.15
Niles,O. N12, M4 ..... 4.15
Torrance,Calif. C11 .... 5.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10 ..... 4.00
Cleveland J5 R2 ..... 4.00
Ecorse,Mich. G5 ..... 4.20
Fairfield,Ala. T2 ..... 4.00
Follansbee,W.Va. F4 ... 4.00
Fontana,Calif. K1 ..... 4.90
Gary,Ind. C3 ..... 4.00
GraniteCity,Ill. G4 ..... 4.20
Ind.Harbor,Ind. I-2, Y1.4.00
Irvin,Pa. C3 ..... 4.00
Lackawanna,N.Y. B2 .. 4.00
Middletown,O. A10 .... 4.00
Niles,O. M4 ..... 4.00
Pittsburg,Calif. C11 ... 4.95
Pittsburgh J5 ..... 4.00
SparrowsPoint,Md. B2 .. 4.00
Steubenville,O. W10 .... 4.00
Warren,O. R2 ..... 4.00
Weirton,W.Va. W6 ..... 4.00
Youngstown Y1 ..... 4.00

SHEETS, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5, R2 ..... 6.05
Ecorse,Mich. G5 ..... 6.25
Fontana,Calif. K1 ..... 6.95
Gary,Ind. C3 ..... 6.05
Ind.Harbor,Ind. I-2, Y1. 6.05
Irvin,Pa. C3 ..... 6.05
Lackawanna,N.Y. B2 .. 6.05
Pittsburgh J5 ..... 6.05
Sharon,Pa. S3 ..... 6.05
SparrowsPoint,Md. B2 .. 6.05
Warren,O. R2 ..... 6.05
Weirton,W.Va. W6 ..... 6.05
Youngstown Y1 ..... 6.05

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy

Cleveland J5, R2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Calif. K1	6.64
Gary,Ind. C3	4.95
Ind.Harbor,Ind. I-2, Y1	4.95
Irvin,Pa. C3	4.95
Lackawanna,N.Y. B2	4.95
Pittsburgh J5	4.95
Sharon,Pa. S3	4.95
So.Chicago,Ill. C3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

SHEETS, Gal'zd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky.(8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.40
Dover,O. R1	5.40
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo,Ind. C16	4.50
MartinsFerry,O. W10	4.40
Niles,O. N12	4.40
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance, Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. C3	6.75
SparrowsPoint,Md. B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	4.95

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2	5.15
Niles,O. R2	5.15
Weirton,W.Va. W6	5.00

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Culvert, No. 16 Flat

	Cu Alloy	Cu FE
Ashland A10	5.00	...
Canton,O. R2	5.05	5.50
Fairfield,Ala. T-2	5.00	5.35
Gary C3	5.00	5.35
GraniteCity G4	5.40	5.70
Irvin C3	5.00	5.35
Kokomo C16	5.40	...
MartinsFy,O. W10	5.00	5.35
Pittsburg,Cal. C11	5.75	...
SparrowsPt. B2	5.00	...
Torrance,Cal. C11	5.75	...

SHEETS, Culvert, No. 16 Flat Ingot Iron

Ashland,Ky. A10	5.25

SHEETS, Well Casing

Torrance,Calif. C11	4.75
Youngstown C3	3.75

SHEETS, ALUMINIZED

Butler,Pa. A10	7.75

SHEETS, Long Terne, Steel (No. 10; Commercial Quality)

BeechBotm.,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Weirton,W.Va. W6	4.80

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville, O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.75
Gary,Ind. C3	6.65
Ind.Harbor,Ind. I-2	6.65
Irvin,Pa. C3	6.65
Weirton,W.Va. W6	6.65
Yorkville,O. W10	6.65

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.20

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Yorkville,O. W10	8.10

SHEETS, Coated Ternes, 12 lb

Gary,Ind. C3	$8.95
Yorkville,O. W10	8.95

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.45	$6.70	$7.00
Fairfield,Ala. T2	6.55	6.80	7.10
Gary,Ind. C3	6.45	6.70	7.00
GraniteCity,Ill. G4	6.65	6.90	7.20
Ind.Harbor,Ind. I-2, Y1	6.45	6.70	7.00
Irvin,Pa. C3	6.45	6.70	7.00
Niles,O. R2	6.45	6.70	7.00
Pittsburg,Calif. C11	7.20	7.45	7.75
SparrowsPoint,Md. B2	6.55	6.80	7.10
Weirton,W.Va. W6	6.45	6.70	7.00
Yorkville,O. W10	6.45	6.70	7.00

SHEET SILICON (24 Gage Base)

	Field	Arm.	Elec.	Motor	Dyn.
BeechBottom,W.Va. W10	...	5.45	5.95	6.70	7.50
Brackenridge,Pa. A4	...	...	5.95	6.70	7.50
Follansbee,W.Va. F4	...	...	5.95	6.70	7.50
GraniteCity,Ill. G4	...	...	6.15	6.90	7.70
Ind.Harbor,Ind. I-2	5.15	5.45	5.95	...	...
Mansfield,O. E6	5.15	5.45	5.95	6.70	...
Niles,O. M4	5.15	5.45	5.95	...	...
Niles,O. N12	...	5.45	5.95	...	...
Toronto,O. F4	...	5.45	5.95	6.70	7.50
Vandergrift,Pa. C3	...	5.45	5.95	6.70	7.50
Warren,O. R2	...	5.45	5.95	6.70	...
Zanesville,O. A10	...	5.45	5.95	6.70	7.50

COILS AND CUT LENGTHS, Cold-Rolled, Silicon

	Field	Arm.	Elec.	Motor	Dyn.
Vandergrift,Pa. C3	...	5.70	6.20	6.95	7.75
Warren,O. R2	5.40	5.70	6.20	6.95	7.75

SHEETS, Silicon Transformer Grade

	72	65	58	52
BeechBottom,W.Va. W10	8.05	8.60	9.30	10.10
Brackenridge,Pa. A4	8.05	8.60	9.30	....
Follansbee,W.Va. F4	8.05	8.60	9.30	10.10
Toronto,O. F4	8.05	8.60	9.30	10.10
Vandergrift,Pa. C3	8.05	8.60	9.30	10.10
Zanesville,O. A10	8.05	8.60	9.30	10.10

COLD-REDUCED COILS and Cut Lengths, Silicon

	72	T-100	T-90	T-80
Butler,Pa. A10	...	12.35	13.60	14.85
Vandergrift,Pa. C3	8.30	11.35	12.60	13.85
Warren,O. R2	8.30	....	....	....

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.50
Cleveland R2	3.85
Ind.Harbor,Ind. I-2	3.50
Warren,O. R2	3.85

SHEETS, Cold-Rolled Ingot Iron

Cleveland R-2	4.60
Middletown,O. A10	4.50
Warren,O. R2	4.60

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky.(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.95

SHEETS, ZINCGRIP No. 10 Flat, Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enam'lg. Iron, No. 12

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Niles,O. M4	4.40
Youngstown Y1	4.40

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.75
Fairfield,Ala. T2	5.85
Gary,Ind. C3	5.75
GraniteCity,Ill. G4	5.95
Ind.Harbor,Ind. I-2, Y1	5.75
Irvin,Pa. C3	5.75
Niles,O. R2	5.75
Pittsburg,Calif. C11	6.50
SparrowsPoint,Md. B2	5.85
Warren,O. R2	5.75
Weirton,W.Va. W6	5.75
Yorkville,O. W10	5.75

TIN PLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$7.50	$7.75
Fairfield,Ala. T2.	7.60	7.85
Gary C3	7.50	7.75
Gran.City,Ill G4.	7.70	7.95
Ind.Harb. I-2, Y1	7.50	7.75
Irvin,Pa. C3	7.50	7.75
Pitts.,Cal. C11	8.25	8.50
Sp.Pt.,Md. B2	7.60	7.85
Warren R2	7.50	7.75
Weirton W6	7.50	7.75
Yorkville,O. W10.	7.50	7.75

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.60

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.25
Detroit M1	3.45
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa, Colo. C10	4.30
NewBritain(10) S15	3.25
N.Tonawanda,N.Y. B11	3.30
Pittsburg,Calif. C11	4.00
Pittsburgh J5	3.25
Riverdale,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa. S3	*3.50*
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.25
Youngstown C3, Y1	3.25

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Harrison,N.J. C18	9.80
NewBritn,Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.25-0.40c	0.40-0.60c	0.60-0.80c	0.80-1.05c	1.05-1.35c
Bridgeprt,Conn.(10) S15	4.00	5.50	6.10	8.05	10.35
Bristol,Conn. W1	...	...	6.40	8.35	....
Carnegie,Pa. S18	...	5.50	6.10	8.05	10.35
Chicago T6	4.25	5.65	6.25	8.20	10.50
Cleveland A7	4.00	5.50	6.10	8.05	10.35
Dover,O. G6	4.00	5.50	6.10	7.85	10.15
Harrison,N.J. C18	...	...	6.40	8.35	10.65
Mattapan,Mass. T6	4.50	5.80	6.40	8.35	10.65
NewBritn.,Conn.(10) S15	4.00	5.50	6.10	8.05	10.35
NewCastle,Pa. B4	4.00	5.50	6.10	...	....
NewCastle,Pa. E5	4.00	5.50	6.10	8.05	10.35
NewYork W3	...	5.80	6.40	8.35	10.65
Pawtucket,R.I. N8 Cleve.orPitts.Base	4.55	5.50	6.10	8.05	10.35
Worcester,Mass.Base	4.50	5.80	6.40	8.35	10.65
Sharon,Pa. S3	4.00	5.50	6.10	8.05	10.35
Trenton,N.J. R5	...	6.30	6.90	8.85	11.15
Union,N.J. H6	4.40	6.35	6.35	8.30	10.50
Wallingford,Conn. W2	4.50	5.80	6.40	8.05	10.35
Weirton,W.Va. W6	4.00	5.50	6.10	8.05	10.35
Worcester,Mass. A7	4.30	5.80	6.40	8.35	10.65
Worcester,Mass, T6	4.50	5.80	6.40	8.35	10.65
Youngstown C8	4.50	5.50	6.10	8.05	10.35
Pawtucket,R.I.(12) N8	9.50				
Sharon,Pa. S3	9.50				
Worcester,Mass. A7	9.50				
Youngstown C8	9.50				

STRIP, Cold-Rolled Carbon

Berea,O. C7	6.10
Bridgeprt,Conn.(10) S15	4.00
Butler,Pa. A10	4.00
Chicago,Ill. T6	4.15
Cleveland A7, J5	4.00
Detroit, D2, D3	4.25
Detroit M1	4.20
Dover,O. G6	4.00
Ecorse,Mich. G5	4.20
Follansbee,W.Va. F4	4.00
Fontana,Calif. K1	4.90
Ind.Harbor,Ind. I-2	4.00
Lackawanna,N.Y. B2	4.00
LosAngeles C1	5.00
Mattapan,Mass.(21) T6	4.50
Middletown,O. A10	4.00
NewBritain(10) S15	4.00
NewCastle,Pa. B4, E5	4.00
NewHaven,Conn. A7, D2	4.50
NewKensington,Pa. A6	4.00
NewYork W3	5.00
Pawtucket,R.I.(11) N8	4.55
Pawtucket,R.I.(21) N8	4.50
Pawtucket,R.I. R3	4.50
Pittsburgh J5	4.00
Riverdale,Ill. A1	4.15
Sharon,Pa. S3	4.00
SparrowsPoint,Md. B2	4.00
Trenton,N.J.(13) R5	5.00
Wallingford,Conn. W2	4.50
Warren,O. R2, T5	4.00
Weirton,W.Va. W6	4.00
Youngstown C8, Y1	4.00

STRIP, Cold-Rolled, High-strength Low-Alloy

Cleveland A7, J5	6.05
Dover,O. G6	6.05
Ecorse,Mich. G5	6.25
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.05
Pittsburgh J5	6.05
Sharon,Pa. S3	6.05
SparrowsPoint,Md. B2	6.05
Warren,O. R2	6.05
Weirton,W.Va. W6	6.05
Youngstown Y1	6.05

STRIP, Electro Galvanized

Weirton,W.Va. W6	4.00
Youngstown C8	4.00

Key to Producing Companies

A1	Acme Steel Co.
A3	Alan Wood Steel Co.
A4	Allegheny Ludlum Steel
A6	American Shim Steel Co.
A7	American Steel & Wire
A8	Anchor Drawn Steel Co.
A9	Angell Nail & Chaplet
A10	Armco Steel Corp.
A11	Atlantic Steel Co.
A13	American Cladmetals Co.
B1	Babcock & Wilcox Tube
B2	Bethlehem Steel Co.
B3	Beth. Pac. Coast Steel
B4	Blair Strip Steel Co.
B5	Bliss & Laughlin Inc.
B6	Boiardi Steel Corp.
B8	Braeburn Alloy Steel
B11	Buffalo Bolt Co.
B14	A. M. Byers Co.
C1	Calif. Cold-Rolled Steel
C3	Carnegie-Illinois Steel
C4	Carpenter Steel Co.
C5	Central Iron & Steel Div. Barium Steel Corp.
C7	Cleve.Cld.Roll.MillsCo.
C8	Cold Metal Products Co.
C9	Colonial Steel Co.
C10	Colorado Fuel & Iron
C11	Columbia Steel Co.
C12	Col. Steel & Shafting Co.
C13	Columbia Tool Steel Co.
C14	Compressed Steel Shaft.
C16	Continental Steel Corp.
C17	Copperweld Steel Co.
C18	Crucible Steel Co.
C19	Cumberland Steel Co.
C20	Cuyahoga Steel & Wire
D2	Detroit Steel Corp.
D3	Detroit Tube & Steel Co.
D4	Disston & Sons,Henry
D6	Driver Harris Co.
E1	Eastrn.Gas&Fuel Assoc.
E2	Eastern Stainless Steel
E4	Electro Metallurgical Co.
E5	Elliot Bros. Steel Co.
E6	Empire Steel Co.
F2	Firth Sterling Steel
F3	Fitzsimons Steel Co.
F4	Follansbee Steel Corp.
F6	Fretz-Moon Tube Co.
G1	Geneva Steel Co.
G2	Globe Iron Co.
G3	Globe Steel Tubes Co.
G4	Granite City Steel Co.
G5	Great Lakes Steel Corp.
G6	Greer Steel Co.
H1	Hanna Furnace Corp.
H4	Heppenstall Co.
H6	Hind Steel Co.Inc.
I-1	Igoe Bros.Inc.
I-2	Inland Steel Co.
I-3	Interlake Iron Corp.
I-4	Ingersoll Steel Div., Borg-Warner Corp.
J1	Jackson Iron & Steel Co.
J3	Jessop Steel Co.
J4	Johnson Steel & Wire Co.
J5	Jones & Laughlin Steel
J6	Joslyn Mfg. & Supply
J7	Judson Steel Corp.
K1	Kaiser Steel Corp.
K2	Keokuk Electro-Metals
K3	Keystone Drawn Steel
K4	Keystone Steel & Wire
K5	Kidd Drawn Steel Co.
L1	Laclede Steel Co.
L2	LaSalle Steel Co.
L3	Latrobe Electric Steel
L5	Lockhart Iron & Steel
L6	Lone Star Steel Co.
L7	Lukens Steel Co.

UNIVERSITY OF MICHIGAN LIBRARIES

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	4.95
Cleveland J5	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	6.64
Gary,Ind. C3	4.95
Ind.Harb.,Ind. I-2, Y1	4.95
Lackawanna,N.Y. B2	4.95
Pittsburgh J5	4.95
Sharon,Pa. S3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

TIGHT COOPERAGE HOOP

Atlanta A11	3.60
Riverdale,Ill. A1	3.60
Sharon,Pa. S3	3.60
Youngstown C3	3.60

WIRE, Cold-Rolled Flat

Chicago T6	5.35
Cleveland A7	5.00
Dover,O. G6	5.00
Fostoria,O. S1	5.50
Kokomo,Ind. C16	5.00
Massillon,O. R8	5.00
Monessen,Pa. P7	5.00
Pawtucket,R.I.(11) N8	5.55
Pawtucket,R.I.(12) N8	5.50
Trenton,N.J. R5	5.80
Worcester,Mass. A7	5.30
Worcester,Mass. T6	5.30

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(19) K4	7.70
Buffalo W12	7.70
Chicago W13	7.70
Cleveland A7	7.70
Fostoria,O. S1	8.20
Johnstown,Pa. B2	7.70
Kokomo,Ind. C16	7.70
Palmer,Mass. W12	8.00
Portsmouth,O. P12	7.70
Struthers,O. Y1	7.70
Trenton,N.J. R5	8.50
Waukegan,Ill. A7	7.70
Worcester, Mass. A7, T6	8.00

WIRE (16 gage)	An'ld. Galv. Stone	Stone
Aliquippa J5	9.05	10.55
Bartnvill(19) K4	9.05	10.55
Cleveland A7	9.05	10.55
Fostoria,O. S1	9.15	10.65
Jonnstown B2	9.05	10.55
Kokomo C16	9.05	10.10
Minnequa C10	9.40	10.90
Palmer,Mass. W12	9.35	10.85
Pitts.,Cal. C11	9.40	10.90
Prtsmth.(18) P12	9.05	10.55
SparrowsPt. B2	9.15	10.65
Struthers Y1	9.05	10.55
Waukegan A7	9.05	10.55

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.15
Aliquippa,Pa. J5	4.15
Alton,Ill.(1) L1	4.15
Bartonville,Ill.(1) K4	4.15
Buffalo W12	4.15
Chicago W13	4.15
Cleveland A7, C20	4.15
Crawfrdsvll,Ind. M8	4.30
Donora,Pa. A7	4.15
Duluth A7	4.15
Fairfield,Ala. T2	4.15
Fostoria,O.(24) S1	4.65
Houston S5	4.55
Johnstown,Pa. B2	4.15
Joliet,Ill. A7	4.15
KansasCity,Mo. S5	4.75
Kokomo,Ind. C16	4.25
LosAngeles B3	5.10
Minnequa,Colo. C10	4.50
Monessen,Pa. P7	4.15
Newark,6-8ga. I-1	4.75
No.Tonawanda B11	4.18
Palmer,Mass. W12	4.45
Pittsburg,Calif. C11	5.10
Portsmouth,O. P12	4.15
Rankin,Pa. A7	4.15
So.Chicago,Ill. R2	4.15
So.SanFrancisco C10	5.10
SparrowsPoint,Md. B2	4.25
Sterling,Ill.(1) N15	4.15
Struthers,O. Y1	4.15
Torrance,Calif. C11	5.10
Waukegan,Ill. A7	4.15
Worcester,Mass. A7, T6	4.45

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	5.55
Alton,Ill.(1) L1	5.55
Bartonville,Ill.(19) K4	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Fostoria,O. S1	6.05
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Milbury,Mass.(12) N6	5.85
Monessen,Pa. P7	5.55
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Trenton,N.J. A7	5.85
Trenton,N.J. R5	6.35
Waukegan,Ill. A7	5.55
Worcester A7,J4,T6,W12	5.85

ROPE WIRE	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	7.10	7.40	7.80
Buffalo W12	7.50	7.80	8.20
Cleveland A7	7.50	7.80	8.20
Donora,Pa. A7	7.50	7.80	8.20
Fostoria,O. S1	8.00	8.30	8.70
Johnstown,Pa. B2	7.50	7.80	8.20
Monessen,Pa. P7	7.50	7.80	8.20
NewHaven,Conn. A7	7.80	8.10	8.50
Palmer,Mass. W12	7.80	8.10	8.50
Portsmouth,O. P12	7.50	7.80	8.20
SparrowsPoint,Md. B2	7.60	7.90	8.60
Struthers,O. Y1	7.50	7.80	8.20
Trenton,N.J. A7	7.80	8.10	8.50
Trenton,N.J. R5	8.00	8.30	8.70
Waukegan,Ill. A7	7.50	7.80	8.20
Williamsport,Pa. B2	7.60	7.90	8.30
Worcester,Mass. J4	7.50	7.80	8.20

WIRE, Merchant Quality (6 to 8 gage)

	An'ld.	Galv.
Ala.,City, R2	4.80	5.25
Aliquippa J5	4.80	5.25
Atlanta A11	4.90	5.35
Bartnville.(19) K4	4.80	5.25
Buffalo W12	4.80	...
Cleveland A7	4.80	5.25
Crawfrdvll. M8	4.95	5.40
Donora A7	4.80	5.25
Duluth A7	4.80	5.25
Fairfield T2	4.80	5.25
Houston,Tex. S5	5.20	5.65
Johnstown B2	4.80	5.25
Joliet,Ill. A7	4.80	5.25
KansasCity,Mo. S5	5.40	5.85
Kokomo C16	4.90	5.35
LosAngeles B3	5.75	...
Minnequa C10	5.15	5.60
Monessen P7	4.80	5.25
Palmer,Mass. W12	5.10	...
Pitts.,Cal. C11	5.75	6.20
Portsmth.(18) P12	4.80	5.25
Rankin A7	4.80	5.25
So.Chicago R2	4.80	5.25
So.S.Fran. C10	5.75	6.20
SparrowsPt. B2	4.90	5.35
Sterling,Ill.(1)N15	4.80	5.25
Struthers,O. Y1	4.80	5.25
Torrance,Cal. C11	5.75	...
Worcester A7	5.10	5.55

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.20
Alton,Ill.(1) L1	5.20
Buffalo W12	5.20
Cleveland A7	5.20
Donora, Pa. A7	5.20
Duluth A7	5.20
Johnstown,Pa. B2	5.20
LosAngeles B3	6.15
NewHaven,Conn. A7	5.50
Palmer,Mass. W12	5.50
Pittsburg,Calif. C11	6.15
Portsmouth,O. P12	5.20
So.Chicago,Ill. R2	5.20
SparrowsPoint,Md. B2	5.30
Struthers,O. Y1	5.20
Torrance,Calif. C11	6.15
Trenton,N.J. A7	5.50
Waukegan,Ill. A7	5.20
Worcester,Mass. A7	5.50

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	123
Aliquippa,Pa. J5	123
Atlanta A11	125
Bartonville,Ill.(19) K4	123
Crawfordsville M8	126
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Houston,Tex. S5	131
Johnstown,Pa. B2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	130
Monessen,Pa. P7	123
Pittsburg,Calif. C11	143
Portsmouth,O.(18) P12	123
Rankin,Pa. A7	123
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	143
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

FENCE POSTS

	Col.
Duluth A7	112
Huntington,W.Va. W7	112
Johnstown,Pa. B2	112
Joliet,Ill. A7	112
Minnequa,Colo. C10	120
Moline,Ill. R2	116
Williamspt,Pa. S19	n.t.$120

WOVEN FENCE, 9-15½ gage

	Col.
Ala.City,Ala.,17-18ga. R2	175
AlabamaCity,Ala. R2	109
Aliquip.,Pa 9-14½ga. J5	109
Atlanta A11	111
Bartonville,Ill.(19) K4	109
Crawfordsvll,Ind. M8	112
Donora,Pa. A7	109
Duluth A7	109
Houston,Tex. S5	117
Fairfield,Ala. T2	109
Johnstown,Pa. B2	109
Johnstn,17ga.,6" B2	183
Johnstn,17ga.,4" B2	186
Joliet,Ill. A7	109
KansasCity,Mo. S5	121
Kokomo,Ind. C16	111
Minnequa,Colo. C10	116
Monessen,Pa. P7	109
Pittsburg,Calif. C11	132
Portsmouth,O.(18) P12	109
Rankin, Pa. A7	109
So.Chicago,Ill. R2	109
Sterling,Ill.(1) N15	109

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	106
Atlanta A11	107
Bartonville,Ill.(19) K4	106
Chicago W13	106
Crawfordsville M8	109
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Joliet,Ill. A7	106
Kokomo,Ind. C16	108
Minnequa,Colo. C10	113
Pittsburg,Calif. C11	130
Portsmouth,O.(18) P12	106
So.Chicago,Ill. R2	106
So.SanFran., Calif. C10	130
SparrowsPoint,Md. B2	108
Sterling,Ill.(1) N15	106

NAILS & STAPLES, Stock (To Dealers & Mfrs.)

AlabamaCity,Ala. R2	103
Aliquippa,Pa. J5	103
Atlanta A11	105
Bartonville,Ill.(19) K4	103
Cleveland A9	110
Crawfordsvile M8	106
Donora,Pa. A7	103
Duluth A7	103
Fairfield,Ala. T2	103
Houston,Tex. S5	111
Johnstown,Pa. B2	103
Joliet,Ill. A7	103
KansasCity,Mo. S5	115
Kokomo,Ind. C16	105
Minnequa,Colo. C10	110
Monessen,Pa. P7	103
Pittsburg,Calif. C11	122
Portsmouth,O. P12	103
Rankin,Pa. A7	103
So.Chicago,Ill. R2	103
SparrowsPoint,Md. B2	105
Sterling,Ill.(1) N15	103
Torrance,Calif. C11	123
Worcester,Mass. A7	109

NAILS, Cut (100 lb keg)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

NAILS & STAPLES, Stock (To Jobbers)

Chicago,Ill. W13	103
Minnequa,Colo. C10	107
Portsmouth,O. P12	100

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.20
Bartonville,Ill.(19) K4	5.20
Donora,Pa. A7	5.20
Duluth A7	5.20
Johnstown,Pa. B2	5.20
Joliet,Ill. A7	5.20
Kokomo,Ind. C16	5.30
Minnequa,Colo. C10	5.55
Pittsburg,Calif. C11	6.15
Portsmouth,O. P12	5.20
Rankin,Pa. A7	5.20
So.Chicago,Ill. R2	5.20
SparrowsPoint,Md. B2	5.30
Worcester,Mass. A7	5.50

AXLES

Fairfield,Ala. T2	5.20
Gary,Ind. C3	5.20
Ind.Harbor,Ind. S13	5.20
Johnstown,Pa. B2	5.20
McKeesRocks,Pa. C3	5.20

TIE PLATES

Fairfield,Ala. T2	4.05
Gary,Ind. C3	4.05
Ind.Harbor,Ind. I-2	4.05
Lackawanna,N.Y. B2	4.05
Minnequa,Colo. C10	4.05
Pittsburg,Calif. C11	4.20
Pittsburgh R2	4.05
Seattle B3	4.50
Steelton,Pa. B2	4.05
Torrance,Calif. C11	4.20
Weirton,W.Va. W6	4.05

JOINT BARS

Bessemer,Pa. C3	4.25
Fairfield,Ala. T2	4.25
Ind.Harbor,Ind. I-2	4.25
Joliet,Ill. C3	4.25
Lackawanna,N.Y. B2	4.25
Minnequa,Colo. C10	4.25
Steelton,Pa. B2	4.25

TRACK BOLTS

	(20) Treated
Fairfield,Ala. T2	8.50
Lebanon,Pa. B2	8.50
Minnequa,Colo. C10	8.25
Pittsburgh,Pa. O3, P14	8.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.35
Ind.Harbor,Ind. I-2, Y1	5.35
Kansas City, Mo. S5	5.60
Lebanon,Pa. B2	5.35
Minnequa,Colo. C10	5.35
Pittsburgh J5	5.35
So.Chicago,Ill. R2	5.35
Struthers,O. Y1	5.35
Youngstown R2	5.35

LIGHT RAILS, Rail Steel

Huntington,W.Va. W7	3.55
Williamsport,Pa. S19	3.55

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb. Under
Bessemer,Pa. C3	3.20	3.10	3.15	3.55
Ensley,Ala. T2	3.20	3.10	3.15	3.55
Fairfield,Ala. T2	...	...	...	3.55
Gary,Ind. C3	3.20	3.10	3.15	...
Ind.Harbor,Ind. I-2	3.20	3.10	3.15	...
Johnstown,Pa. B2	...	...	...(16)	3.55
Lackawanna B2	3.20	3.10	...	3.55
Minnequa,Colo. C10	3.20	3.10	...	4.25
Steelton,Pa. B2	3.20	3.10	...	...

Key to Producing Companies

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M10 Missouri-Illinois Furnace
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 New Eng.High Carb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U4 Universal-Cyclops Steel
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Corp.
W7 W. Va. Steel & Mfg. Co.
W8 Wstrn.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Co.
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.
Y1 Youngstwn. Sheet & Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	19.00	18W,4Cr,3V	114.50
Extra Carbon	22.00	18W,4Cr,2V,9Co	168.50
Spec. Carbon	26.50	18W,4Cr,2V,6Co	154.00
Oil Hardening	29.00	18.25W,4.25Cr,1V,4.75Co	142.00
Hi.-Carbon-Cr	52.00	20.25W,4.25Cr,1.6V,12.25Co	266.50
Cr Hot Wrk.	29.00	1.5W,4Cr,1V,8.5Mo	65.00
18W,4Cr,1V	90.50	6.4W,4.5Cr,1.9V,5Mo	69.50
18W,4Cr,2V	102.50	6W,4Cr,3V,5Mo	88.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M9, M14, R2, S8, T7, U4, V2, V3.

(1) Chicago Base. (2) Angles.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. Base.
(8) 16 gage and heavier.
(9) 6" and narrower.
(10) Pittsburgh Base.
(11) Cleveland & Pittsburgh Base.
(12) Worcester, Mass. Base.
(13) 3" & wider; over ½" to under 3" 5.50c.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh Base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. Base.
(22) Del. San Fran. Bay area.
(23) Angles 1"x1" to 1¼"x1¼" only.
(24) Deduct 0.35c for finer than 15 Ga.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % —Black— A	B	C	—Galvanized— D	E	F
⅛	5.5c	0.24	41.5	39.5	38.5	13.5	11.5	10.5
¼	6.0	0.42	39.5	37.5	36.5	15.5	13.5	12.5
⅜	6.0	0.57	36	34	33	12.5	10.5	9.5
½	8.5	0.85	43	41	42	26.5	24.5	25.5
¾	11.5	1.13	46	44	45	30.5	28.5	29.5
1	17.0	1.68	48.5	46.5	47.5	33.5	31.5	32.5
1¼	23.0	2.28	49	47	48	34	32	33
1½	27.5	2.73	49.5	47.5	48.5	34.5	32.5	33.5
2	37.0	3.68	50	48	49	35	33	34
2½	58.5	5.82	50.5	48.5	49.5	35.5	33.5	34.5
3	76.5	7.62	50.5	48.5	49.5	35.5	33.5	34.5

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va. 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower ⅜", W10; Wheatland, Pa., 2 points lower on ⅛ through ⅜", W9. Following make ½ through 3" only: Lorain, O. N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on ½" through 3".

Columns B & E: Sparrows Point Md. B2; Wheatland, Pa., ⅛" through ⅜", W9.

Columns C & F: Alton, Ill. (Lorain, O. Base) LI; Indiana Harbor, Ind., ½" through 3", Y1.

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜" W10; Wheatland, Pa., except 2 pts lower on ⅛" through ⅜" W9. Following make ⅛" through 3" only; Lorain N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on ½" through 3".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	38.5	23	38.5	23
2½	58.5	5.82	41.5	26	41.5	26
3	76.5	7.62	41.5	26	41.5	26
3½	92.0	9.20	43.5	28	43.5	28
4	$1.09	10.89	43.5	28	43.5	28
5	1.48	14.81	43.5	28	43.5	28
6	1.92	19.18	43.5	28	43.5	28

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 4 to 24 in., inclusive.

O.D. In.	B.W. Ga.	—Seamless— H.R.	C.D.	Elec. Weld H.R.	C.D
1	13	11.50	13.39	13.00	13.00
1¼	13	13.62	15.87	13.21	15.39
1½	13	15.05	17.71	14.60	17.18
1¾	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2¼	13	21.37	25.16	20.73	24.40
2¼	12	23.54	27.70	22.83	26.88
2½	12	25.79	30.33	25.02	29.41
2¾	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3¼	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78
4½	9	58.99	69.42	....	....
5	9	68.28	80.35	....	....
6	7	104.82	123.33	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pacific Tube Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding Stainless	—Plates— Carbon Base 10%	20%	—Strip— Cold-Rolled Carbon Base 10% Both Sides		—Sheets— Carbon Base 10%	20%	Copper Base Both Sides
302	....	....	....	....	19.75	21.50	75.00
304	22.50	26.50	....	....	20.75	22.50	77.00
305	....	....	....	....	....	....	79.00
309	27.00	31.00	....	....	....	....	....
310	32.50	36.50	....	....	....	....	105.00
316	27.00	31.00	....	....	26.00	28.00	....
317	30.50	34.50	....	....	....	....	....
318	29.50	33.50	....	....	....	....	....
321	23.50	27.50	....	....	23.00	25.00	90.00
347	25.00	29.00	....	....	24.00	26.00	94.00
405	18.75	24.75	....	....	....	....	....
410	18.25	24.25	....	....	....	....	....
430	18.25	24.25	....	....	....	....	....
Nickel	27.50	34.50	31.50	41.00	....	....	88.00
Inconel	36.00	46.00	....	....	....	....	115.00
Monel	29.00	37.00	26.50	33.50	....	....	83.00
Copper*	....	....	19.75†	23.75†	....	....	....

* Deoxidized, † Deduct 4.25c for hot-rolled. Production for carbon base products are: Stainless plates and sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville, Pa. L7; nickel, inconel and monel-clad plates, Coatesville L7; nickel, monel and copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

(To consumers)

F.o.b. midwestern plants. Additional discounts on carriage, machine bolts, 5 for cl; 15 for full containers, except tire and plow bolts.

CARRIAGE, MACHINE BOLTS

(Per cent off list)

½-in., smaller; up to 6 in. long	35
⅝ & ¾ x 6 in., shorter	37
¾-in. & larger x 6 in., shorter	34
All diameters longer than 6-in.	30
Tire bolts	25
Plow bolts	47
Lag bolts, 6 in., shorter	37
Lag bolts, longer than 6 in.	35

NUTS

Semifinished hexagon	A.S. Reg. & Light	Heavy
⅞-in., smaller	.41 off	.....
½-in., smaller	....	38 off
½-in.-1-in.	...39 off	.....
⅝-in.-1-in.	....	37 off
1⅛-in.-1½-in.	.37 off	35 off
1⅝-in., larger	.34 off	28 off

Additional discount of 15 for full containers.

STOVE BOLTS

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

SQUARE HEAD SET SCREWS

Upset 1-in. & smaller..51 off
¾, ⅞, & 1 x 6-in. & shorter ..... 35 off
Headless, ¼-in., larger..31 off

HEXAGON CAP SCREWS

(Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright) ..... 46 off
Upset (1035 heat treated) ⅝ and smaller x 6 and shorter ..... 40 off

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 6.75c
⅞-in., under .....48 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers .....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

—Inches— Diam.	Length	Cents per lb.
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4,5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	84,90	7.50
14	60,72	8.00
10,12	60	8.25

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.

Imported, net ton, duty paid, metallurgical grade, $39-$40.

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	37.50	30.50	28.50
302	37.50	33.00	28.50
303	39.50	36.50	31.00
304	39.50	35.00	30.00
309	52.00	52.00	41.50
316	53.00	55.00	46.00
321	45.50	44.50	34.00
347	50.00	48.50	38.50
410	33.00	27.00	23.00
416	33.50	33.50	23.50
420	40.50	43.50	28.50
430	35.50	27.50	23.50
501	24.00	22.50	11.50
502	25.00	23.50	12.50

Baltimore, Types 301 through 347 sheets, except 309 E2.

Baltimore, bars, wire and structurals A10.

Brackenridge, Pa., sheets A4.

Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.

Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.

Cleveland, strip, except Type 309 quoted 51.00c, and except Type 416 A7.

Detroit, strip, except Type 309 M1.

Dunkirk, N. Y., bars, wire A4.

Duquesne, Pa., bars C3.

Gary, Ind., sheets except Type 416 C3.

Harrison, N. J., strip C18.

Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c, Type 501, 10.50c, Type 502 11.50c R2.

McKeesport, Pa., bars; sheets except Type 416, C3.

McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.

Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars C3.

Pittsburgh, sheets C18.

Reading, Pa., bars & strip except Type 309 bars quoted 42.00c C4.

So. Chicago, Ind., bars & structurals C3.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars U4.

Wallingford, Conn., strip, except 309, W2 quotes ¼-cent h'gher.

Washington, Pa., bars, sheets & strip except Type 309 strip quoted 51.00c J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303 & 309; 316 sheets 58.00c strip 60.00c W4.

Watervliet, N. Y., structurals & bars A4.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, except Type 309 quoted 51.00 A4.

Youngstown, strip C8.

COAL CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 20.00
Toluol, one deg...19.00-23.50
Industrial xylol ..20.50-26.50

Per ton bulk, ovens
Sulphate of ammonia..$45.00

Per pound, ovens
Phenol, 40 (carlots, returnable drums) 13.25
Do., less than carlots..14.00
Do., tank cars 12.50

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh)

	Cents
Sponge Iron:	
98+% Fe, carlots...	15.00
Swedish, c.i.f. New York, in bags..	7.40-8.50
Electrolytic Iron:	
Annealed, 99.5% Fe.	39.50
Unannealed, 99+% Fe	33.50
Unannealed, 99+% Fe (minus 325 mesh)	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns..	65.00-130.00
Aluminum:	
1500-lb lots, freight allowed	29.00
Atomized, 500-lb drums, freight allowed	30.50
Brass, 10-ton lots	23.25-26.25
Copper:	
Electrolytic	28.625
Reduced	27.75
Lead	19.25
Manganese:	
Minus 100 mesh	52.00-55.00
Minus 35 mesh	48.00
Minus 200 mesh	56.00
Nickel, unannealed	61.00-66.00
Silicon	34.00-40.00
Solder (plus cost of metal)	8.50
Stainless Steel, 302	75.00
Zinc, 10-ton lots..	15.50-18.25
	Dollars
Tungsten:	
99%, minus 80 to 200 mesh, freight allowed, 1000 lb and over	2.90
500 to 1000 lb	2.95
less than 500 lb	3.05
98.8%, minus 65 mesh, freight allowed, 1000 lb and over	2.90
less than 1000 lb	3.05
Tin	1.075
Molybdenum:	
99%, minus 80 to 200 mesh, over 500 lb	2.25
200 to 500 lb	2.50
less than 200 lb	2.75
82-88%, freight allowed, 2000 lb and over	2.40
less than 2000 lb	2.45
Chromium, electrolytic, 99% Cr min.	3.50

METALLURGICAL COKE

Price per Net Ton

BEEHIVE OVENS

Connellsvll, fur.	$13.00-13.50
Connellsvll, fdry	15.50-16.00
New River, foundry	18.00
Wise county, foundry	15.35
Wise county, furnace	14.60

OVEN FOUNDRY COKE

Kearny, N. J., ovens	$22.00
Everett, Mass., ovens	....
New England, del.‡	22.70
Chicago, ovens	20.00
Chicago, del.	†21.45
Detroit, del.	23.91
Terre Haute, ovens	20.20
Milwaukee, ovens	20.75
Indianapolis, ovens	19.85
Chicago, del.	23.32
Cincinnati, del.	22.77
Detroit, del.	23.75
Ironton, O., ovens	19.40
Cincinnati, del.	21.63
Painesville, O., ovens	20.90
Buffalo, del.	23.02
Cleveland, del.	22.62
Erie, del.	21.04
Birmingham, ovens	17.70
Philadelphia, ovens	20.45
Swedeland, Pa., ovens	20.40
Portsmouth, O., ovens	19.50
Detroit, ovens	20.65
Detroit, del.	*21.70
Buffalo, del.	22.95
Flint, del.	23.00
Pontiac, del.	21.98
Saginaw, del.	23.30

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.03 freight zone from works.

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WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R. 15 Ga.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.60	6.51	7.10	5.82	...	5.77	6.31	8.28	5.53	5.85	7.36
New York(c'try)	5.40	6.31	6.90	5.62	...	5.57	6.11	8.08	5.33	5.65	7.16
Boston (city) ..	5.75	6.75**	7.16	5.80	...	5.72	6.22	8.77	5.62	5.95	7.45
Boston (c'try) .	5.55	6.55**	6.96	5.60	...	5.52	6.02	8.57	5.42	5.75	7.25
Phila. (city)...	5.90	6.45-6.49	6.88	5.65	...	5.65	6.21	8.10	5.35	5.60	6.80
Phila. (c'try) ..	5.65	6.20-6.24	6.63	5.40	...	5.40	5.96	7.85	5.10	5.35	6.55
Balt. (city)....	5.46	6.36	6.81	5.52	...	5.57	6.05	...	5.51	5.71	7.16
Balt. (c'try)...	5.31	6.21	6.66	5.37	...	5.42	5.91	...	5.36	5.56	7.01
Norfolk, Va. ..	5.80‡	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
Wash. (w'hse).	6.07‡	...	...	5.83	...	5.88	6.62	...	5.82	6.02	7.47
Buffalo (del.)..	5.00‡	5.90	7.57	5.39	6.42	5.10	5.60	10.13	5.15	5.50	7.06
Buffalo (w'hse)	4.85‡	5.75	7.42	5.24	6.27	4.95	5.40	9.60	5.00	5.35	6.91
Pitts. (w'hse)..	4.85	5.75[4]	6.80	5.00	6.00	4.90	5.40	9.20††	4.90	5.05	6.55
Detroit (w'hse).	5.32	6.22[4]	7.35	5.42	6.42-6.73	5.48	5.90	8.44-8.59	5.48	5.67	7.02
Cleveland (del.)	5.00	5.90	6.70	5.15-5.18	6.15	5.15-5.16	5.60	7.84-8.00	5.15-5.16	5.35-5.36	6.80-6.81
Cleve. (w'hse) .	4.85	5.75	6.55	5.00-5.03	6.00	5.00-5.01	5.45	7.84-7.85	5.00-5.01	5.20-5.21	6.65-6.66
Cincin. (w'hse).	5.27‡	5.94**	6.83	5.39	6.10	5.44	5.95	...	5.44	5.64	7.05
Chicago (city) .	5.05	5.95[4]	7.05	5.05	6.35-6.85	5.10	5.60	7.90[5]	5.10	5.30	6.75
Chicago (w'hse)	4.85	5.75[4]	6.85	4.85	6.15-6.65	4.90	5.40	7.70[5]	4.90	5.10	6.55
Milwaukee (city)	5.18	6.08[4]	7.18	5.18	6.48-6.98	5.23	5.78	8.03[5]	5.23	5.43	6.88
Milwau. (c'try).	5.03	5.93[4]	7.03	5.03	6.33-6.83	5.08	5.63	7.88[5]	5.08	5.28	6.73
St. Louis (del.)	5.37	6.27[4]	7.44	5.34	6.64	5.39	6.19[6]	6.64	5.39	5.59	7.04
St. L. (w'hse) .	5.22	6.12[4]	7.29	5.19	6.49	5.24	6.04[6]	6.49	5.24	5.44	6.89
Birm'ham (city)	5.00	5.90	6.55	5.00	...	5.00	6.83	...	5.05	5.25	7.69
Birm'ham(c'try)	4.85	5.75	6.40	4.85	...	4.85	6.68	...	4.90	5.10	7.54
Omaha, Nebr...	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	5.60	7.15	7.60	6.10	7.75	5.75	7.40	...	5.60	5.65	7.90
L. A. (w'hse)..	5.45	7.00	7.45	5.95	7.60	5.60	7.25	...	5.45	5.50	7.75
San Francisco..	6.15[10]	7.50[3]	7.80	6.75[10]	8.25[8]	5.90[10]	7.55	10.85[2]	5.90	6.35	8.10
Seattle-Tacoma.	6.70[7]‡	8.15[3]	8.80	6.70[7]	...	6.20[7]	8.15[1]	10.10	6.00[7]	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); § as rolled; ** 17 gage; †† as annealed. Base quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 1000 lb and over; galvanized sheets, 450 lb to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 1499 lb; [4]—400 to 1499 lb; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—300 to 999 lb; [8]—1500 to 1999 lb; [9]—400 to 3999 lb; [10]—400 lb and over; [11]—500 to 1499 lb.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $100. Hard-fired, $135 at above points.

High-heat Duty: Salina, Pa. $85; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., Ottawa, Ill., $66.

LADLE BRICK

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa., Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.
Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

MALLEABLE BUNG BRICK

St. Louis. Mo., Olive Hill, Ky., Ottawa, Ill., $90; Beach Creek, Pa., $80.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa., $85; Joliet or Rockdale, Ill., E. Chicago, Ind., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., Birmingham, $80.
Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $81.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; Chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ¾" grains; Bulk, $30.50-$31; single paper bags, $35-$35.50.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. Any increase or decrease in R.R. freight rates, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$7.60
Old range nonbessemer	7.45
Mesabi bessemer	7.35
Mesabi nonbessemer	7.20
High phosphorus	7.20

EASTERN LOCAL ORE

Cents per unit, del. E. Pa.

Foundry and basic 56.62% concentrates, contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot:	17.00
Long-term contract	15.00
Brazil iron ore, 68-69%	18.50

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty paid	$20-$22

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 81.8c-83.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8: 1	$35.00
48% 3:1	37.50
48% no ratio	28.50-29.00

South African Transvaal

44% no ratio	$19.00-20.00
45% no ratio	19.50-21.00
48% no ratio	27.00-28.00
50% no ratio	28.50-29.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	28.00-29.00
48% 3:1 lump	37.50

Domestic—rail nearest seller

48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

Manganese Alloys

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn., Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

Chromium Alloys

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(Please turn to page 125)

Tin, Lead Prices Ease Further

Straits offered at 85.00c for prompt delivery while futures are available at sharp concessions. Lead drops to 11.80c, St. Louis, on continued light demands

New York—Restoration of free trading conditions in world tin markets has been followed by a precipitous decline in prices. Within a few days following the reopening of the London and Singapore markets, prices in the former dropped over £105 (13 cents per pound) and over £150 (about 19 cents per pound) in the latter market. The domestic market has declined proportionately, although it has been effected over a longer period. Grade A tin made the initial break from the $1.03 RFC level on Sept. 26 and dropped to 85.60c by Nov. 21, a drop of 18 cents a pound.

Weakness has characterized trading this month also in lead, the market now being quoted on the basis of 11.80c, St. Louis. Copper and zinc display a steady price tone on the basis of 18.50c, Connecticut, and 9.75c, East St. Louis, respectively.

Tin — Tin Sales Corp., selling agency for the Reconstruction Finance Corp., resumed offerings for immediate delivery of Grade A tin at 85.00c, New York, on Monday. Previous differentials for other than spot delivery were reinstated. RFC had withdrawn from the market on Nov. 18. Up to Sept. 28, while RFC was the sole importer and seller of tin to United States consumers, its price had been $1.03. On that date, after American consumers were permitted to buy tin anywhere, the price was lowered to 96.00c a pound. It was reduced to 95.00c on Oct. 24, meeting the price quoted by the British Ministry of Supply at that time.

Meanwhile, the open market for spot tin has slumped to the 85-cent level for spot and as low as 78.00c for February arrival. The market has had practically no consumer buying support during this readjustment period. Refusal of consumers to purchase futures at the substantial price concessions indicates their distrust of the stability of the market.

The British Ministry of Supply holds about 31,000 tons of tin which will be released at a rate insuring reasonable price stability, George Strauss, supply minister, said last week in London. He added that final disposition of any unsold stocks would be considered when the market had time to settle down.

Lead—Lead prices declined ½-cent a pound Nov. 21 to the basis of 11.80c, St. Louis, and 12.00c, New York. The price is now back to the year's low that prevailed from May 26 to July 8. It had recovered to 14.92½c, St. Louis, on Aug. 8 and subsequently has lost all the gain of 3.125 cents.

Forces back of the slow demand for lead and price easiness are the same as have been dominant since early fall. Increased foreign production, lack of United States funds in Europe, and lessened demand abroad have resulted in metal normally consumed in Europe being offered for sale to American consumers. In addition, lead of Yugoslavian and Japanese origin has been offered to consumers here at a concession from the American price.

Meanwhile, makers of lead products in this country are not adding to their inventories now with the yearend at hand. As a result, sales are failing to meet intake of ores, concentrates and scrap. It is the practice of custom smelters to dispose of their intake daily. Scrap lead offerings have increased and custom units have increased their smelting charge for scrap lead battery plates to $70 a ton, equivalent to a discount of 5 cents a pound for lead content.

Effective Nov. 21, prices of lead sheets and pipe declined ½-cent a pound while lead traps and bends, combination lead and iron bends are now quoted at list plus 45 per cent against plus 48 per cent previously. Prices of lead oxides also declined ½-cent a pound.

Copper—Transactions in the copper market continue restricted, due to the relatively small tonnages available for December delivery. Producers are well booked and are maintaining prices at the 18.50-cent level. The supply situation is expected to remain tight well into the new year. Orders booked for November shipment to fabricators exceed 105,000 tons, indicating that deliveries this month will be larger than the October movement of 108,192 tons. Additional tonnages shipped to the government lifted the October total to over 123,000 tons and will similarly swell the November total.

Although the primary copper market still displays a firm to strong undertone, the secondary markets are slightly weaker. The price spread quoted in brass ingot market has widened while some refiners have lowered their bids for scrap.

Zinc—Labor difficulties in Idaho, which had closed down several important lead-zinc producers, have been settled and it is expected that the zinc smelter of Bunker Hill & Sullivan Mining & Concentrating Co. will increase its operations steadily from an estimated rate of 30 per cent for the last several months. The rate is expected to reach 50 per cent of capacity in December and still higher in January. Zinc is quotable at 9.75c, East St. Louis, since several other custom units have joined the one seller at that level who did not follow the rise to 10.00c named by two of the leading producers earlier in November. All but a small tonnage of total business transacted lately has been done at the 9.75-cent level.

Expects Profitable Operations

Boston—Prices of nonferrous metals now are reaching the point of stabilization and no great fluctuations are expected to take place in copper or zinc, Herman W. Steinkraus, president, Bridgeport Brass Co., Bridgeport, Conn., said here last week. Because of inventory write-off caused by the break in metal prices early in the year, Bridgeport Brass showed a net loss for the nine months ended Sept. 30 of $1,562,616 against a net profit of $1,321,852 for the like period a year ago. For the September quarter, the company reported a net profit of $68,388 against $506,627 a year ago.

Bridgeport Brass Co.'s operations now are on a profitable basis and the final quarter of 1949 will be the best for the year, Mr. Steinkraus said. Now that the steel strike is over and the coal situation is likely to improve, there ought to be a good situation in the brass industry with operations at reasonably high levels. While 1950 should be a profitable year for the industry, he does not look for the big volume of 1948, although he said it would be at a much better level than in the first nine months of 1949.

Bridgeport Brass is diversifying its products other than those made of brass and copper. The company expects to bring out at least one new line of products in 1950 which preliminary market tests indicate will have considerable possibilities.

Discuss New Copper Contract

London—Progress has been made towards reaching a price settlement for copper in new contracts between Northern Rhodesian copper companies and the British Ministry of Supply, reports A. Chester Beatty, chairman of Roan Antelope Copper Mines Ltd.

Although no final settlement has been reached, the Ministry has indicated that the previous pricing basis shall be continued. This means that future prices which the Ministry will pay to Northern Rhodesian producers will continue to be hinged to the American quotation converted into pound sterling at the official exchange rate and adjusted by freight and grade differentials.

Roan Antelope's production for the first quarter has been provisionally contracted for on a basis price of 17.62½c per pound for electrolytic copper, f.a.s. New York. The company's sales, which previously had been made for delivery to the Ministry six months ahead, now are on a three months basis.

Lead Mine Output Declines

WASHINGTON — Average daily rate of lead production from domestic mines declined 8 per cent in September from the August level, reports the Bureau of Mines. September lead output, in terms of recoverable metal, was 30,281 net tons, an average of 1009 tons per day, compared with 33,905 tons in August, an average of 1094 tons per day.

The Bureau also reports that August receipts and consumption of lead-base scrap and residues at secondary smelter plants increased 33 and 29 per cent, respectively, compared with July. Net recovery of lead, tin and antimony was 32,038 tons, a gain of 19 per cent.

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NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 18.50c, Conn. Valley, Lake, 18.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 17.25-18.25c; 88-10-2 (No. 215) 26.25c; 80-10-10 (No. 305) 22.75c; No. 1 yellow (No. 405) 14.25-16.00c.

Zinc: Prime western 9.75c, brass special 10.00c, intermediate 10.25c, East St. Louis; high grade 10.75c, delivered.

Lead: Common 11.80c; chemical, 11.90c; corroding, 11.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloys 16.50-17.00c; No. 12 foundry alloy (No. 2 grade) 16.25-16.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00-18.25c; grade 2, 17.50-17.75c; grade 3, 16.00-16.25c; grade 4, 15.50-15.75c. Prices include freight at carload rate up to 75 cents per 100 lb.

5% titanium-aluminum alloy No. 1 (low Cu) 31.00c; No. 2 (2% Cu) 28.00c, f.o.b. Eddystone, Pa.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt delivery, 85.00c; November arrival, 84.50c; December arrival, 84.00c; January arrival, 79.00c; February arrival, 77.00c; March arrival, 76.00c. Chinese, 99% tin, prompt del., 80.00c; November arrival, 79.00c.

RFC selling prices for prompt delivery, ex-dock New York or f.o.b. Texas City, Tex.: Grade A, 99.8% or higher (including Straits) 85.00c.

Antimony: American 99-99.8% and over but not meeting specifications below, 32.00c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 32.50c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99% (Chinese, English, Belgium), prompt, 26.00c, New York.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $73-$75 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-98%, $1.80 per lb for 550 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 73.25c per oz.

Platinum: $69-72 per ounce.

Palladium: $24 per troy ounce.

Iridium: $100-$110 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 18.50-cent copper.)

Sheet: Copper 32.18; yellow brass 28.69; commercial bronze, 95% 32.10; 90%, 31.61; red brass, 85%, 30.60; 80%, 30.12; best quality, 29.58; nickel silver, 18%, 42.27; phosphor-bronze, grade A, 5% 50.90.

Rods: Copper, hot-rolled 28.03; cold-drawn 29.28; yellow brass free cutting, 23.19; commercial bronze, 95% 31.79; 90% 31.30; red brass 85% 30.29; 80% 29.81.

Seamless Tubing: Copper 32.22; yellow brass 31.70; commercial bronze 90% 34.27; red brass 85% 33.51; 80% 33.03.

Wire: Yellow brass 28.98; commercial bronze, 95% 32.39; 90% 31.90; red brass, 85% 30.89; 80% 30.41; best quality brass 29.87.

Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots 23.30 l.c.l. 23.925, c.l. 23.425; weatherproof, f.o.b. eastern mills, 100,000 lb lots 25.35, l.c.l. 26.10, c.l. 25.60; magnet, delivered, c.l. 28.50, 15,000 lb or more 28.75, l.c.l. 29.25.

ALUMINUM

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-24	36.8	33.4	39.5
0.008-0.0075	12-24	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	——Hexagonal—— R317-T4	17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	36.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $17.00 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $17.00 per cwt. Traps and bends: List price plus 45%.

ZINC

Sheets, 15.50c f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 15.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 14.00c; over 12-in., 15.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton, 27.00c.

Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 28.84c; oval 28.34c; cast 26.87c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.25c; over 250 lb, 24.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00; under 100 lb, 64.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbls, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over, 111.00c, 500 to 999 lb, 111.50c; 200 to 499 lb 112.00c; less than 200 lb, 113.50c; ball, 1000 lb and over, 113.25c; 500 to 999 lb, 113.75c; 200 to 499 lb. 114.25c; less than 200 lb, 115.75c f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 67.9c; 100 or 300 lb drums only, 100 to 500 lb, 59.7c; 600 to 1900 lb, 57.3c; 2000 to 9900 lb, 55.5c, f.o.b. Sewaren, N. J. On 100 or 350 lb drums only, 100 to 600 lb 59.7c; 600 to 1900 lb, 57.3c; 2000 to 9900 lb, 55.5c; 10,000 lb and over, 54.4c, f.o.b. Carteret, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100-lb drums 38.00c, f.o.b. Niagara Falls, N. Y.; 40.50c, f.o.b. Cleveland; 39.25c, del., Detroit and Philadelphia.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 96.00c; more than 2000 lb, 94.00c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 83.00c; 100 lb kegs 84.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	15.50	15.50	14.75
Yellow brass	12.50	12.25	11.37½
Commercial Bronze			
95%	14.50	14.25	13.75
90%	14.25	14.00	13.50
Red brass			
85%	14.00	13.75	13.25
80%	13.62½	13.37½	12.87½
Best Quality (71-80%)	13.37½	13.12½	12.62½
Muntz Metal	11.50	11.25	10.75
Nickel, silver, 10%	14.50	14.25	7.25
Phos. bronze, A	16.75	16.50	15.50
Naval brass	12.00	11.75	11.25
Manganese bronze	12.00	11.75	11.12½

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 15.00, No. 2 copper 14.00; light copper 13.00; composition red brass 13.00; radiators 10.00; heavy yellow brass 10.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 15.00; No. 2 copper 14.00; light copper 13.00; refinery brass (60% copper) per dry copper content 13.25; radiators 9.50.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and Brass: Heavy copper and wire No. 1 13.50-13.75; No. 2 12.50-12.75; light copper 11.50-11.75; No. 1 composition red brass 11.25-11.50; No. 1 composition turnings 10.75-11.00; mixed brass turnings 6.75-7.00; new brass clippings 10.50-11.00; No. 1 brass rod turnings 9.25-9.50; light brass 6.50-6.75; heavy yellow brass 7.75-8.00; new brass rod ends 9.75-10.00; auto radiators, unsweated 8.75-9.00; cocks and faucets, 9.25-9.50; brass pipe 9.75-10.00.

Lead: Heavy 9.50-9.75, battery plates 5.00-5.25; linotype and stereotype 10.00-10.25; electrotype 9.00-9.25; mixed babbitt 9.75-10.00.

Zinc: Old zinc 4.25-4.75; new die cast scrap 4.00-4.50; old die cast scrap 3.00-3.25.

Tin: No. 1 pewter 48.00-50.00, block tin pipe 70.00-72.00, No. 1 babbitt 36.00-38.00.

Aluminum: Clippings 2S 10.50-11.00; old sheets 7.50-8.00, crankcase 7.50-8.00, borings and turnings 3.00-3.50.

DAILY PRICE RECORD

1949	Copper	Lead	Zinc	Tin	Aluminum	timony	Nickel	Silver
Nov. 21-22	18.50	11.80	9.75	85.00	17.00	32.00	40.00	73.25
Nov. 18-19	18.50	12.30	9.75	85.50	17.00	32.00	40.00	73.25
Nov. 17	18.50	12.30	9.75	90.00	17.00	32.00	40.00	73.25
Nov. 16	18.50	12.30	9.75	92.00	17.00	32.00	40.00	73.25
Nov. 15	18.50	12.55	9.75	92.50	17.00	32.00	40.00	73.25
Nov. 14	18.50	12.60	9.75	92.00	17.00	32.00	40.00	73.25
Nov. 12	18.50	12.60	9.75–10.00	93.50	17.00	32.00	40.00	73.25
Nov. 10	18.50	12.60	9.75-10.00	93.50	17.00	32.00	40.00	73.25
Nov. 9	18.50	12.80	10.00	94.50	17.00	32.00	40.00	73.25
Nov. 7-8	18.50	12.80	9.75	94.50	17.00	32.00	40.00	73.25
Nov. 3-5	18.50	12.80	9.75	94.00	17.00	32.00	40.00	73.25
Nov. 1-2	17.625	12.80	9.75	94.00	17.00	32.00	40.00	73.25
Oct. Avg.	17.625	13.242	9.317	95.505	17.00	32.00	40.00	73.25

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del, New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, Nov. 23, 1949; gross tons except as noted. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Nov. 23	$29.83
Nov. 17	30.00
Oct. 1949	26.71
Nov. 1948	43.25
Nov. 1944	16.40

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	*$33.00-34.00*
No. 2 Heavy Melt.	*31.00**
No. 1 Busheling	*33.00**
No. 1 Bundles	*33.00-34.00*
No. 2 Bundles	*27.00**
No. 3 Bundles	*25.00**
Heavy Turnings	24.50-25.00
Machine Shop Turnings	22.50-23.00†
Mixed Borings, Turnings	23.50-24.00
Short Shovel Turnings	25.00-26.00
Cast Iron Borings	22.50-23.00
Low Phos. Steel	35.50-36.50

Cast Iron Grades*

No. 1 Cupola Cast	37.00-38.00
No. 1 Machinery Cast	39.00-40.00
Charging Box Cast	31.00-32.00
Heavy Breakable Cast	28.00-29.00

Railroad Scrap*

No. 1 R.R. Heavy Melt.	33.50-34.00
Axles	36.00-37.00
Rails, Random Length	35.00-36.00
Rails, 2 ft and under	39.00-40.00
Rails, 18 in. and under	40.00-41.00
Railroad Specialties	33.00-34.00
Angles, Splice Bars	32.50-33.50

* Nominal.
† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$30.00-30.50
No. 2 Heavy Melt. Steel	30.00-30.50
No. 1 Busheling	30.00-30.50
No. 1 Bundles	30.00-30.50
No. 2 Bundles	23.50
Machine Shop Turnings	*19.00-20.00*
Mixed Borings, Turnings	20.00†
Short Shovel Turnings	20.00†
Cast Iron Borings	20.00†
Bar Crops and Plate	32.00-32.50
Punchings & Plate Scrap	32.00-32.50
Cut Structurals	32.00-32.50

† Nominal.

Cast Iron Grades

No. 1 Cupola	44.00-45.00
Charging Box Cast	37.00-38.00
Stove Plate	38.00-39.00
Heavy Breakable Cast	35.00-36.00
Unstripped Motor Blocks	32.50-33.50
Brake Shoes	31.00-32.00
Clean Auto Cast	45.00-46.00
No. 1 Wheels	39.00-40.00
Burnt Cast	33.00-34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.00-34.00
R.R. Malleable	38.50-39.00
Rails, 3 ft and under	43.00-44.00
Rails, 18 in. and under	44.00-45.00
Rails, Random Lengths	38.00-39.00
Cast Steel	35.00-36.00
Railroad Specialties	35.00-36.00
Uncut Tires	35.00-36.00
Angles, Splice Bars	41.00-42.00

VALLEY

No. 1 Heavy Melt. Steel	$32.50-33.00
No. 2 Heavy Melt. Steel	30.50-31.00
No. 1 Bundles	32.50-33.00
No. 2 Bundles	25.00-25.50
Machine Shop Turnings	22.50-23.00
Short Shovel Turnings	24.50-25.00
Cast Iron Borings	23.50-24.00
Low Phos.	31.00-31.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.00-34.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$26.00-27.00
No. 2 Heavy Melt. Steel	24.50
No. 1 Busheling	24.50
No. 1 Bundles	*27.00*
No. 2 Bundles	23.50
Machine Shop Turnings	17.00-18.00
Short Shovel Turnings	*19.00*
Mixed Borings, Turnings	*17.00*
Bar Crop and Plate	*28.00-29.00*
Punchings & Plate Scrap	*28.00-29.00*
Cut Structurals	*28.00*
Elec. Furnace Bundles	*27.00-28.00*
Heavy Turnings	26.00-27.00
No. 1 Chemical Borings	*28.00-29.00*

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
No. 1 Machinery Cast	38.00-39.00
Charging Box Cast	35.00-36.00
Heavy Breakable Cast	35.00-36.00
Unstripped Motor Blocks	30.00
Clean Auto Cast	38.00-39.00
No. 1 Wheels	38.00-39.00
Malleable	39.00

CINCINNATI

No. 1 Heavy Melt. Steel	$30.00
No. 2 Heavy Melt. Steel	27.00
No. 1 Busheling	29.00
No. 1 Bundles	30.00
No. 2 Bundles	24.00
Machine Shop Turnings	17.00
Short Shovel Turnings	20.00
Mixed Borings, Turnings	18.00
Cast Iron Borings	20.00

Cast Iron Grades

No. 1 Cupola Cast	42.00
Charging Box Cast	33.00
Heavy Breakable Cast	36.00
Stove Plate	32.00
Unstripped Motor Blocks	22.00
Brake Shoes	24.00
Clean Auto Cast	42.00
Drop Broken Cast	45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00
R.R. Malleable	35.00
Rails, Rerolling	40.00
Rails, Random Length	37.00
Rails, 18 in. and under	45.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	*$25.00-26.00*
No. 1 Bundles	*29.00-30.00*
No. 2 Bundles	*25.00-26.00*
No. 1 Busheling	*28.00-30.00*
Machine Shop Turnings	*19.00-20.00*
Mixed Borings, Turnings	*19.00-20.00*
Short Shovel Turnings	*21.00-22.00*
Cast Iron Borings	*21.00-22.00*
Punchings & Plate Scrap	*28.00-30.00*

Cast Iron Grades

No. 1 Cupola Cast	*36.00-37.00*
Heavy Breakable Cast	*32.00-33.00*
Clean Auto Cast	*36.00-37.00*

BUFFALO

No. 1 Heavy Melt. Steel	$29.50-30.00
No. 2 Heavy Melt. Steel	27.50-28.00
No. 1 Bushelings	27.50-28.00
No. 1 Bundles	28.50-29.00
No. 2 Bundles	25.50-26.00
Machine Shop Turnings	20.00-20.50
Mixed Borings, Turnings	21.00-21.50
Cast Iron Borings	21.00-21.50
Short Shovelings	22.50-23.00
Low Phos.	31.50-32.00

Cast Iron Grades

No. 1 Machinery	37.50-38.00
No. 1 Cupola	36.50-37.00
Mixed Yard	35.50-36.00
Malleable	34.50-35.00

Railroad Scrap

Rails, 2 ft. and under	38.00-39.00
Scrap rails	35.00-36.00
Specialties	35.00-36.00
No. 1 car wheels	36.00-37.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	$23.00-24.00
No. 2 Heavy Melt. Steel	20.00-21.00
No. 1 Busheling	20.00-21.00
No. 1 Bundles	23.00-24.00
No. 2 Bundles	19.00
Machine Shop Turnings	11.00-12.00
Mixed Borings, Turnings	11.00-12.00
Short Shovel Turnings	11.00-12.00
Punchings & Plate Scrap	23.00-24.00
Cut Structurals	23.00-24.00
Elec. Furnace Bundles	23.00-24.00

Cast Iron Grades

No. 1 Cupola Cast	29.00-30.00
No. 1 Machinery	31.00-32.00
Charging Box Cast	25.00-26.00
Heavy Breakable	25.00-26.00
Unstripped Motor Blocks	26.00
Malleable	36.00

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	$21.00-22.00
No. 2 Heavy Melt. Steel	18.50-19.00
No. 1 Bundles	21.00-22.00
No. 1 Busheling	18.50-19.00
Machine Shop Turnings	13.00-13.50
Mixed Borings, Turnings	13.00-13.50
Short Shovel Turnings	15.00-16.00
Bar Crops and Plate	23.00-24.00
Punchings & Plate Scrap	23.00-24.00
Chemical Borings	19.00-19.50

Cast Iron Grades

No. 1 Cupola Cast	30.00-31.00
Mixed Cast	27.00-28.00
Heavy Breakable Cast	28.00-29.00
Stove Plate	24.00-25.00
Unstripped Motor Blocks	20.00-21.00

CHICAGO

No. 1 Heavy Melt. Steel	*$29.00-30.00*
No. 2 Heavy Melt. Steel	*26.00-27.00*
No. 1 Bundles	*29.00-30.00*
No. 2 Bundles	*24.00-25.00*
No. 3 Bundles	*16.00-17.00**
Machine Shop Turnings	21.00-22.00
Mixed Borings, Turnings	21.00-22.00
Short Shovel Turnings	22.00-23.00
Cast Iron Borings	20.00-21.00
Bar Crops and Plate	*31.50-32.50*
Punchings	*31.50-32.50*
Elec. Furnace Bundles	29.00-30.00
Heavy Turnings	24.00-25.00
Cut Structurals	30.00-31.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-43.00
Clean Auto Cast	42.00-43.00
No. 1 Wheels	34.50-35.50
Stove Plate	33.00-34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	*32.00-33.00**
Malleable	37.00-38.00
Rails, Rerolling	44.00-45.00
Rails, Random Lengths	39.00-40.00
Rails, 2 ft. and under	42.00-43.00
Rails, 18 in. and under	43.00-44.00
Railroad Specialties	35.00-36.00
Angles, Splice Bars	36.00-37.00

* Nominal.

BIRMINGHAM

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	24.50
No. 1 Busheling	24.00
No. 2 Bundles	22.00
Machine Shop Turnings	15.00
Mixed Borings, Turnings	15.00
Short Shovel Turnings	19.00
Cast Iron Borings	18.00
Bar Crops and Plate	30.00
Cut Structurals	23.00

Cast Iron Grades

No. 1 Cupola Cast	34.00-35.00
Stove Plate	28.00-30.00
No. 1 Wheels	23.00-24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.00
R. R. Malleable	nominal
Rails, Rerolling	37.00
Rails 3 ft. and under	25.00-26.00
Angles and Splice Bars	31.00-33.00

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No. 1 Heavy Melt. Steel	$31.00-32.00
No. 2 Heavy Melt. Steel	26.00-27.00
Machine Shop Turnings	19.00-20.00
Short Shovel Turnings	*22.00-23.00*

Cast Iron Grades

No. 1 Cupola Cast	37.00-38.00
Charging Box Cast	*31.00-32.00*
Heavy Breakable Cast	*28.00-29.00*
Brake Shoes	32.00-33.00
Clean Auto Cast	40.00-42.00
Burnt Cast	32.00-33.00

Railroad Scrap

R.R. Malleable	31.00-32.00
Rails, Rerolling	40.00-42.00
Rails, Random Lengths	*37.00-38.00*
Rails, 3 ft. and under	*39.00-40.00*
Uncut Tires	29.00-30.00
Angles, Splice Bars	37.00-38.00
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Nos. 1 & 2 Bundles	13.00

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Railroad Scrap

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Rails, Random Lengths	17.00

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No. 2 Heavy Melt. Steel	18.00
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Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	13.00
Mixed Borings, Turnings	13.00
Punchings & Plate Scrap	22.00
Cut Structurals	22.00
Elec. Furnace Bundles	23.00

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Malleable	20.00
Brake Shoes	18.00
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No. 1 Wheels	25.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	19.00
Railroad Malleable	25.00
Rails, Random Lengths	19.00
Angles and Splice Bars	19.00

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No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
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Mixed Borings, Turnings	12.00
Punchings & Plate Scrap	24.00
Electric Furnace Bundles	26.00

Cast Iron Grades

No. 1 Cupola Cast	$32.00

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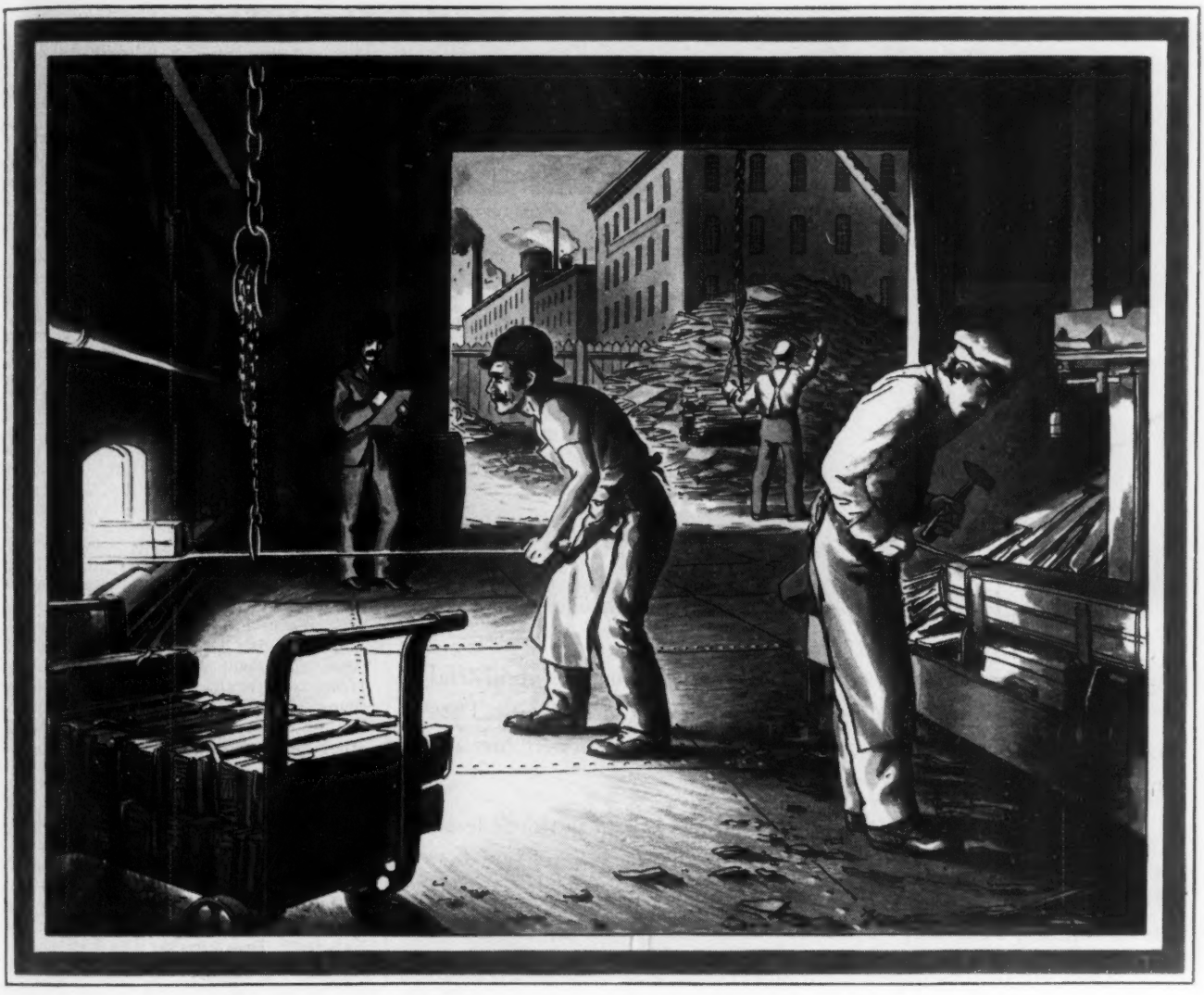
Rails, Rerolling	27.00
Busheling	18.00
Bushelings new factory, prep'd	22.00
Bushelings new factory, unprep'd	17.00
Short Steel Turnings	18.00

Cast Iron Grades*

Cast	40.00-43.00

* Removed from price control Aug. 9, 1947; quoted on basis of f.o.b. shipping point.



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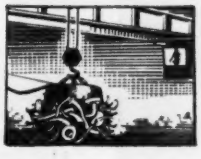

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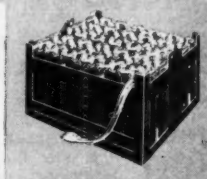

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Sheets Strip . . .

Sheet and Strip Prices, Page 103 & 104 & 105

Cleveland—Tight supply conditions well into 1950 loom in sheets and strip. Consumers appear more optimistic on the supply outlook than do producers, anticipating fairly comfortable conditions by mid-first-quarter. The mills, however, report order backlogs are so heavy they will have little new tonnage to offer before second quarter, if then. Republic Steel Corp., is booked solidly through first half on cold-rolled sheets and strip. It is allocating tonnage to its various district offices based upon the sales pattern established during 1948-49. While some duplicated tonnage may wash out, thus easing the burden on the mills, producers have screened orders carefully with the result it is unlikely duplicate orders will approximate anything like the volume experienced during the period of acute shortage in 1948 and early 1949. Material is flowing from the mills in steadily rising volume, but prestrike finished product flow is not expected to be attained until some time in December.

Strike of long-distance truckers interfered with the movement of steel from mills last week to some extent. However, with numerous trucking firms quickly coming to terms with the union it was expected scheduled steel hauls would not be greatly delayed.

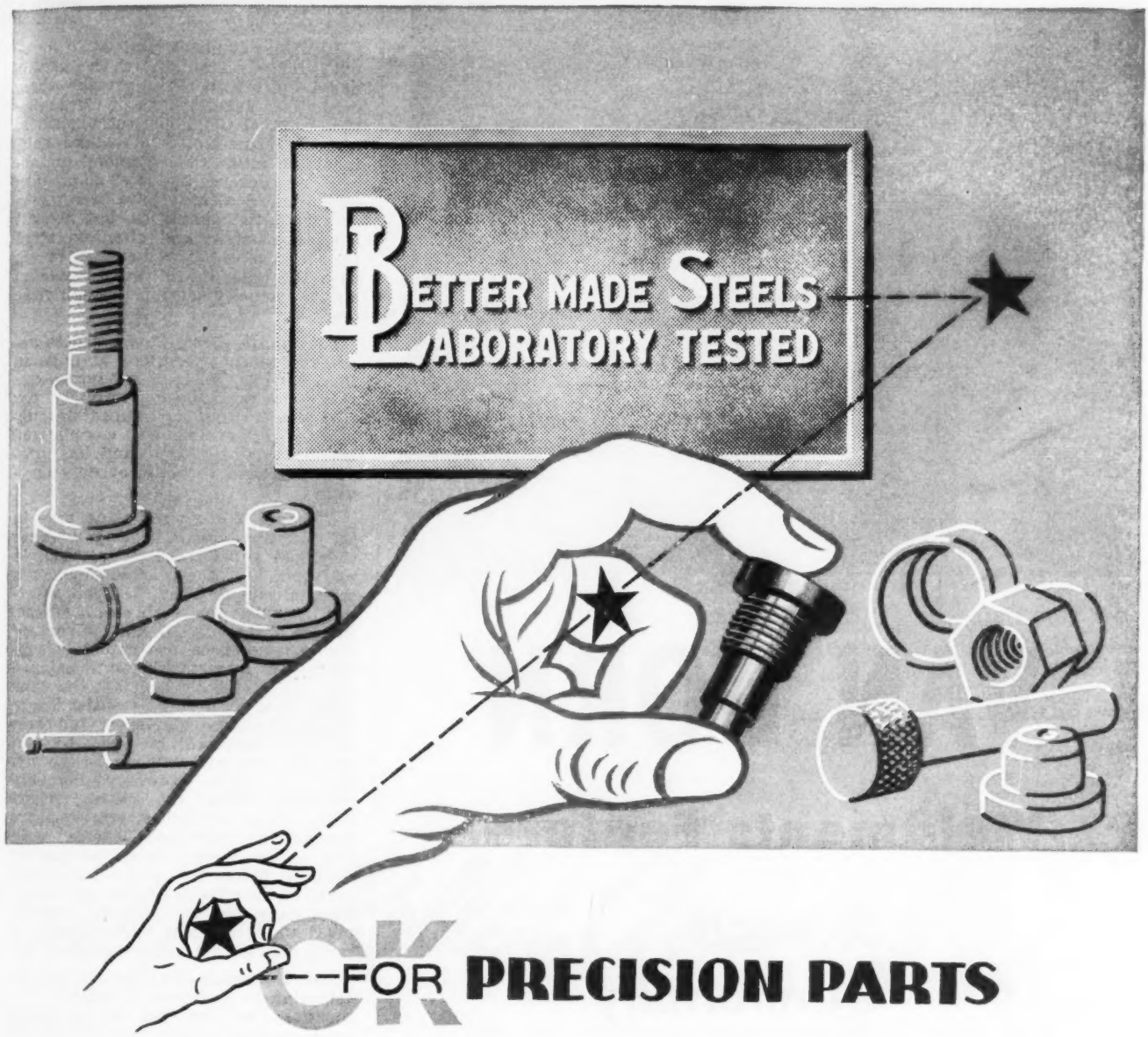
Sharon, Pa.—Sharon Steel Corp. increased hot-rolled strip, 6-in. and under, $5 a ton to $3.50 f.o.b. mill, effective Nov. 22.

Philadelphia—Sheet metal fabricators are pressing for deliveries while jobbers are endeavoring to bring inventories into some semblance of balance. Pressure so far has shown little abatement in any direction. Producers are keeping a close eye on developments in the automotive industry, especially as they shape up over the next several weeks.

Mills generally are practically booked up for the first quarter on carbon grades and in some cases, where they are willing to commit themselves, well into the second quarter. One leading eastern producer has virtually sold out for the first quarter on hot sheets, but has not opened books beyond February on cold sheets.

New York—Most sheet sellers are booked for first quarter on carbon grades. A few are accepting orders for second quarter and building up backlogs through May. One midwestern producer, who recently entered labor agreements covering three units down since Oct. 1, is expected to open books this week on carbon grades for first quarter.

Boston—Flat-rolled steel shipments are heavy and most consumers are getting inventories in better balance with indications production schedules will be less seriously affected than had been predicted. New buying has eased on some products and more extended volume is likely to be subject to readjustments next quarter. Balancing off in delivery schedules among mills is gradually developing. First quarter mill schedules are filled and fair volume is being booked for second, though some producers are taking nothing beyond May. Inquiry



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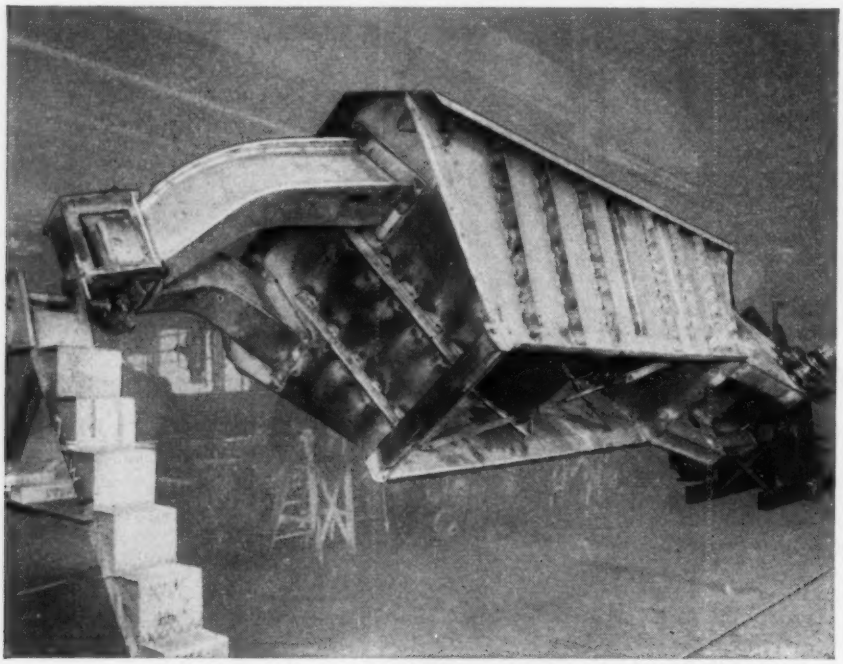

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for stainless strip is heavier, notably from one shipyard.

Pittsburgh—Sheet and strip output since termination of the strike has been considerably greater than predicted. Irvin Works of Carnegie-Illinois Steel Corp. has established a record on its No. 2 five-stand cold reduction mill. Check among metalworking concerns indicates shipments on old orders already have been made in substantial quantities, but not all cold-rolled strip and stainless steel producers have reached an agreement with the union. Mill order backlogs assure capacity output through first quarter.

Cincinnati—Pressure for sheets assures capacity operations at mills in this district. District producers are ready to open books formally for first quarter, but curtailment in output by the strikes has complicated the delivery situation and has prevented a clear estimate of the carryover.

Chicago—Some purchasing men in the Midwest are wondering whether they had acted too hastily when, in midsummer, they cold-shouldered steel salesmen. They are again wearing a path to steel sales offices. Stocks of cold-rolled and galvanized sheets never became completely adequate, but were moving into balance before the strike which set the time table back perhaps six months. There is a good chance that sheet and strip capacity here will be fully booked, but that material will not be too difficult to obtain elsewhere, the only premium being the extra freight cost. This possibility still appears remote for galvanized sheets, very few users having been adequately supplied before the strike, but seems quite distinct for hot-rolled and somewhat less so for cold-rolled. Scattered producers are contemplating a price increase on galvanized.

San Francisco—Fabricators are attempting to replenish inventories. Indications are supplies of flat-rolled products will be tight the next several months. Cold-rolled and galvanized sheets are in greatest demand.

Semifinished Steel . . .

Semifinished Prices, Page 103

Sharon, Pa.—Sharon Steel Corp. raised the price on carbon rerolling billets, blooms and slabs $5 to $57 and on sheet bars $5 to $57, effective Nov. 22.

Tin Plate . . .

Tin Plate Prices, Page 104

Pittsburgh—Distribution of tin mill products will be controlled closely through first quarter. Consumers' stocks were reduced throughout the strike, although no significant curtailment in operations among can companies occurred. Producers shipped substantial tonnages from mill warehouse stocks immediately upon termination of the strike and still additional tonnage was soon available upon completion of finishing operations of orders in process at time of the shutdown. Full tin plate operating schedules are held likely at the close of this week.

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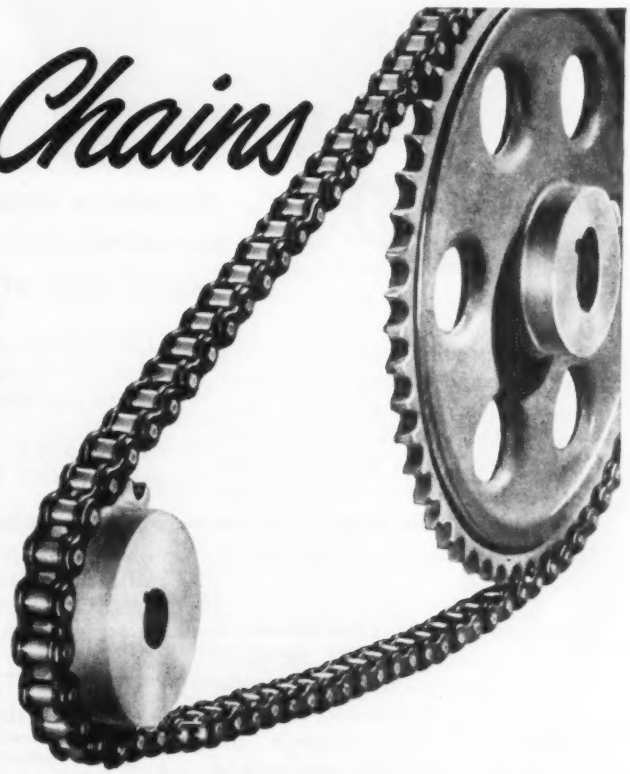

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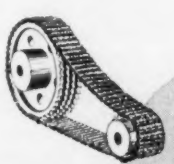

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Reinforcing Bars . . .

Reinforcing Bar Prices, Page 103

Cleveland—Reinforcing bar demand last week was curtailed by the cold weather which swept in over this area. Few projects of consequence are pending and sellers anticipate limited volume until better weather returns.

Los Angeles—Demand for reinforcing bars is sustained, although deliveries are available within one to two weeks. Public works and residential jobs dominate building here.

Seattle—Decline in new steel orders is reflected in operations of rolling mills. Bethlehem Pacific Coast Steel Corp., Seattle, is using only two of five furnaces. Northwest Steel Rolling Mills, Inc., Seattle, is rolling only four days a week, although furnaces are at full capacity. Oregon Steel Mills, Portland, is also on a four-day rolling schedule.

Steel Bars . . .

Bar Prices, Page 103

Pittsburgh—Carbon and alloy merchant bar output at near capacity is expected at least through January. Few bar consumers were forced to curtail operations sharply due to low inventories. Unusually swift resumption of finishing mill operations eased the threat of a critical supply situation, with the result full metalworking schedules will be achieved earlier than predicted. A mixed inventory situation is noted among consumers of cold-finished bars, some reporting idle equipment due to depleted stocks while others are reducing inventory. Columbia Steel & Shafting Co. is scheduled to resume operations this week.

New York—Carbon bar buyers are building working inventories, although some are willing to coast a bit insofar as new orders are concerned and await shipments against orders already placed.

Realization that most producers can ship against new orders within a few weeks has caused consumers to ease pressure noted a couple weeks ago.

Boston—Orders for hot-rolled carbon bars are being taken for January shipment with new demand slightly slower. Availability of cold-finished bars varies with size and grade. On some, stock shipment is possible, but bars to be processed take three to four weeks and heat-treated stock is promised for late January and early February.

Philadelphia—Carbon bar sales are leveling off, as consumers experience a steadily increasing flow from the mills. They are less concerned over prospects for getting additional tonnage, as mill promises now average around four to five weeks.

Cleveland—No acute shortages are anticipated in carbon and alloy bars. Producers' order backlogs are substantial, but pressure for deliveries from consumers is not comparable with that for sheet and strip.

San Francisco—Supplies of bars are increasingly plentiful. During the strike, inventories did not dip as low as some other products. Buying pressure is not insistent.

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Structural Shapes . . .

Structural Shape Prices, Page 103

Boston—Except for public work, notably bridges, new volume of structural steel being estimated is light with district fabricating shop backlogs down to two months and less. This is reflected in demand for plain material with standard shapes available in two or three weeks.

Pittsburgh—Structural fabricating activity is improved. Substantial tonnages were booked early last week. In most instances, order backlogs extend 3 to 4 months, dependent on type of project. As a result, a number of bridge and plant expansion projects are being delayed.

San Francisco—New industrial construction is picking up. Structural supplies are fairly adequate. Users are starting to replace items depleted during the strike.

Seattle—Fabricating plants are reducing backlogs because they are booking only small tonnages. Inventories of plain materials are sufficient to tide plants over until eastern mills resume normal shipments.

Plates . . .

Plate Prices, Page 103

New York—Plate buying is limited, but steady. Mills, which until recently had been closed by strikes, are operating at a fairly good rate and expect to be caught up on arrearages soon, after which, unless there is some unexpected spurt in demand, they will again restrict output. Most producers can accept tonnage for shipment before yearend.

Boston—Demand for plates is mostly in light gages required for small tanks. Some decline in orders for underground type tanks is noted. Business is spotty, some mills in position to deliver this year. An increasing volume of plates in small lots is being shipped by truck from eastern Pennsylvania. Plate fabricators are carrying limited inventories, depending on prompt shipments.

Philadelphia—With district demand slack, some plate producers are reaching out for business through absorption of at least a certain portion of the freight. Most can still make delivery promises of three to five weeks. Demand principally is from jobbers and fabricators of light tanks. One district railroad is inquiring for a modest tonnage of plates and shapes for car repairs, the first semblance of demand of this character in some time. District plate production is the highest since well before the strike, although a leveling off is expected before the end of the year.

Pittsburgh—Plate deliveries are not extended nearly so far as other flat-rolled products. Tank requirements have eased and relatively little improvement is noted in barge construction needs. Sellers anticipate better first quarter orders from railroad car builders. Fairly prompt delivery is available on floor plates, one mill having openings in December schedules.

Seattle—Plate shops report the usual seasonal decline in new business. Inventories, except for special orders, are ample for current needs.

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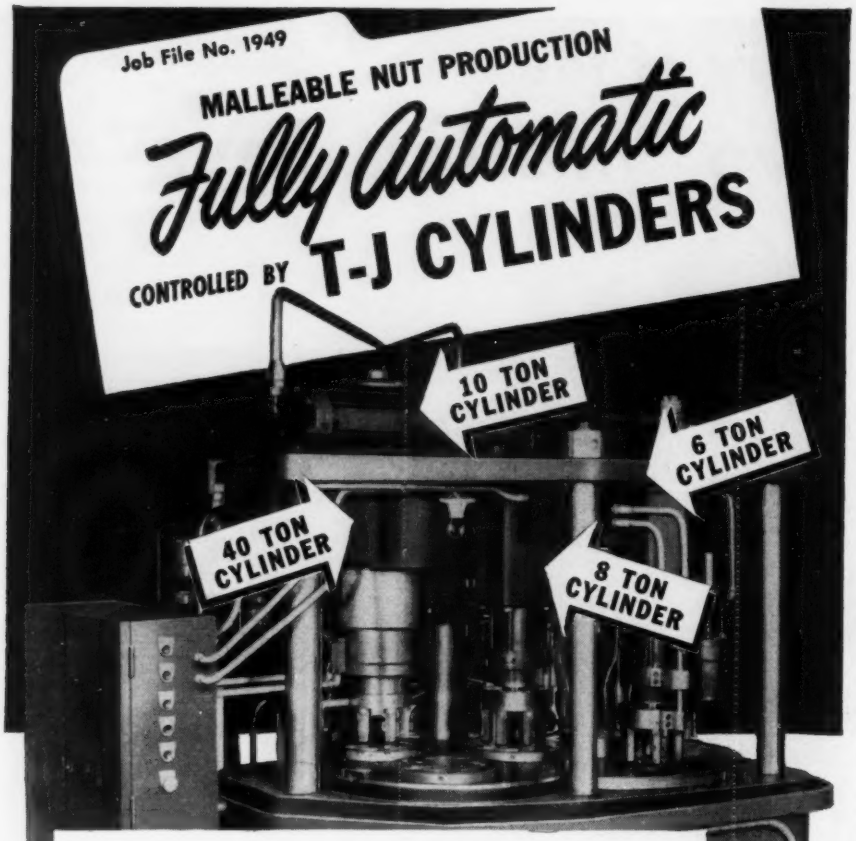
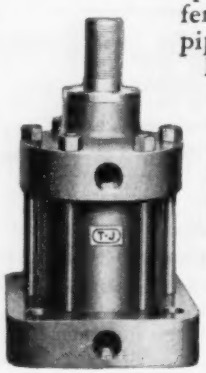


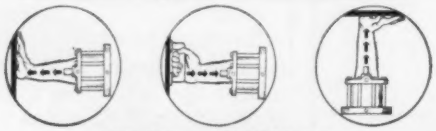
All moving parts are controlled hydraulically by T-J Cylinders—on this Malleable Nut Production Machine designed and built by Roy Hays & Associates, Rockford, Ill., for the Wagner Malleable Products Co., Decatur, Ill.

It's *fully automatic*—the operator only places nuts in stations. Nine T-J Cylinders, 40 ton to ½ ton, help complete the job of cutting off sprue, sizing, boring, facing, chamfering and threading 2,500-¾ std. pipe thread nuts per hour.



For your tough jobs of power movement — pushing, pulling or lifting—*save labor, speed production* and *cut costs* with T-J Air and Hydraulic Cylinders! Many standard sizes and styles . . . both cushioned and non-cushioned types . . . 100 lb. or 50,000 lb. Precision-built for long-life dependability. Write for latest catalogs. The Tomkins-Johnson Co., Jackson, Mich.

FOR POWER MOVEMENT IN ANY DIRECTION



100 LB. or 50,000 LB.

T-J
TOMKINS-JOHNSON
RIVITORS . . AIR AND HYDRAULIC CYLINDERS . . CUTTERS . . CLINCHORS

Tubular Goods . . .

Tubular Goods Prices, Page 106

Los Angeles — Requirements for small diameter pipe are heavy. Fabrication of large pipe is on a substantial scale for major gas and water lines. Demand from the oil industry is receding as petroleum companies cut back output and shave prices. Cheap fuel oil is cutting into natural gas sales for industrial consumption in California.

Seattle—Interest in cast iron pipe is seasonally inactive. No sizable projects are up for bids. Agencies are covering small orders out of warehouse inventories.

Metal Powders . . .

New York — Promising demand prospects for its new steel powders are seen by executives of the Vanadium-Alloy Steel Co., Latrobe, Pa. Reports in financial circles here are to the effect the company up to Aug. 1 had sold 10,000 pounds and about 1000 pounds had been furnished for test purposes. Sixteen different compositions had been turned out up to that time, some 16 accounts had purchased small amounts of the powders, and 39 others are making tests.

Wire . . .

Wire Prices, Page 105

Pittsburgh—Wire shipments over the next few months will be controlled to achieve fairest distribution, but return to formal allotments is not indicated. Some integrated mills limit order acceptances for wire rods because of their own heavy requirements. An unusually large backlog of wire rod orders for shipment to nonintegrated mills has developed. Seasonal factors should improve demand for fencing and barbed wire. Jobbers' stocks of nails in popular sizes are badly depleted. Sellers' backlogs range 2 to 3 months on manufacturers' wire items. Improved demand is noted from furniture manufacturers and screw machine interests. No let-up is indicated in automotive needs.

Boston—Mills resuming production after the strike suspension are taking first quarter orders while those who lost no production are well advanced on bookings for that period. Some fourth quarter tonnage will extend into first quarter, but mostly products requiring longer processing time.

Chicago—Not all wire mills here are fully booked on all products. At some, capacity for merchant items, with the exception of nails, is partially open until late next month at which time seasonal demand is expected to rise. Stocks of welded mesh are low, due to heavy requirements for road construction. Manufacturers' wire demand is extremely heavy.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 107

Boston—Standard Nut & Bolt Co., Valley Falls, R. I., booked an order for machine nuts and bolts for the Navy at $58,638. Springfield Armory closes Dec. 9 on 285 tons.

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Iron Ore . . .

Iron Ore Prices, Page 106

Ceveland—Stocks of iron ore increased to 47,017,398 tons on Nov. 1 from 45,356,369 tons a month earlier and compared with 43,883,357 tons on Nov. 1, 1948, reports the Lake Superior Iron Ore Association. The Nov. 1 total does not include the substantial tonnages which are still in the holds of the vessels which were tied up during the strike.

Consumption dropped to only 876,792 tons in October from 5,541,187 tons in September and compared with 7,273,213 tons in October of last year.

Pig Iron . . .

Pig Iron Prices, Page 102

Pittsburgh—Unusually heavy demand for pig iron from producers of enamelware and radiation equipment has developed. Considerable improvement in orders also is noted from ingot mold interests. Foundries serving the railroad equipment field report little change in order volume, but anticipate a substantial increase next quarter.

New York—With more blast furnaces in full operation, pig iron is moving more freely into this district. Actually, orders are limited because most consumers are in comfortable supply position.

Boston—Pig iron shipments are off around 10 per cent this month compared with October. Outlook for an increase in the melt is uncertain, especially after Jan. 1 with 4 to 5 of the largest consumers.

Philadelphia—Pressure for foundry iron is definitely off, with most consumers in comfortable position and with producers able to make prompt deliveries. At present, there appears to be no particular concern among pig iron and coke buyers with regard to another coal tie up.

Buffalo—Blast furnace operations in this district jumped six points last week to 81 per cent of capacity as Hanna Furnace Co. relighted its third stack. No merchant iron is being piled in this area but a portion of current output is moving into storage.

Cleveland—Blast furnace operations in this district are rapidly getting back to normal and threat of a shortage of pig iron is vanishing. Both stacks of the American Steel & Wire Co. are in operation. Republic Steel Corp. added its fifth stack last week to the active list, while the two blast furnaces of Jones & Laughlin Steel Corp. are blowing.

Youngstown — Twenty-one blast furnaces are in operation in this district. Republic Steel has four on at Youngstown and one at Warren, Youngstown Sheet & Tube's Campbell works, two at its Brier Hill plant, and it is starting up its Hubbard stack. Five blast furnaces of Carnegie-Illinois Steel Corp. are in blast here, while Sharon Steel Corp. has a stack on at Lowellville and another at its Farrell works. Shenango Furnace Co. is operating one blast furnace and plans to start a second.

Cincinnati—Pig iron from northern and southern furnaces is moving into this district steadily, but in light volume reflecting only fair foundry melt.

"They Switched to SPEED TREAT STEEL PLATE and Cut Machining Time and Tool Costs" Plus IMPROVING THEIR PRODUCT

CHISHOLM, BOYD & WHITE, Inc., Chicago, builders of brick and clay plant machinery were using cast alloy steel for 10' 9" long side arms for their principal product, quote the "BOYD BRICK PRESS."

The cast arms were susceptible to sand holes, were difficult to machine, required more machining because they were necessarily cast oversize and additional time was required to age the parts.

They switched to Speed Treat (X1545) medium carbon, open hearth steel plate. Arms were delivered flame cut from 5½" thick plate, stress relieved. They are easy to machine and tool life was greatly increased. The "as-machined" surface facilitates final machining. With a tensile strength of 90 - 100,000 p.s.i. they excel the castings formerly used for this service.

Free machining Speed Treat is one of the Holliday cost-cutting Speed Steels. Send for Bulletin 901.

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Plants: Hammond and Indianapolis, Indiana

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Horace T. Potts Co., Philadelphia—Baltimore

Scrap . . .

Scrap Prices, Page 110

Philadelphia—While prices on most grades of steel mill scrap are unchanged, the market undertone is a shade easier. District consumers are still buying lightly and some not at all. At least one consumer has 60 days supply on hand.

Nos. 1 and 2 heavy melting steel No. 2 bundles, and No. 1 busheling are unchanged; No. 1 bundles are a shade higher at $27. Short shovel turnings are now $19, mixed borings and turnings, $17. Bar crop and plate and punchings and plate scrap are $28-$29 and cut structurals $28. Electric furnace bundles are higher at $27-$28; chemical borings at $28-$29.

Pittsburgh—Upward trend continued in open-hearth scrap prices last week with sale of a representative tonnage at $34 for No. 1 heavy melting and No. 1 bundles. Considerable tonnage is still moving at $33, and the quotable range for these grades is $33-$34.

Award of railroad lists, expected momentarily, should reflect recent upward price adjustments in other scrap grades. Despite indication of near capacity steel output through most of first quarter and adverse weather conditions for collection and segregation of scrap in the offing, mills have not re-entered the scrap market for large tonnages following resumption of operations.

New York—Scrap brokers' buying prices are unchanged throughout the list. Demand for steel grades from Pittsburgh area is still brisk, although little business is developing in eastern Pennsylvania area.

Buffalo—Sale of an additional 5000 tons of steelmaking scrap was reported last week to a leading mill consumer. This transaction lifted the total tonnage moved recently to approximately 20,000 tons. Prices are up $2 per ton on these sales, injecting firmer tone into the market. Dealers, however, report no difficulty acquiring material to cover their commitments.

Cleveland—Scrap prices held unchanged last week at $30-$30.50 for No. 1 heavy melting. Prices are based on the latest reported sale, $33 Valley. Mills are well stocked. Many of them laid down substantial tonnages in yards during the steel strike, and are reluctant to make new commitments at the prices now asked before their reserves are reduced.

Cincinnati—Scrap is moving more freely to melters as mills step up operations. Reappearance of buying has strengthened the market. Prices are steady, but some dealers are holding tonnage on expectations of further increases. Demand for cast grades is dull.

Detroit—Strong dealer sentiment and prospects for greatly reduced volume of production scrap from motor plants are driving prices ahead, steel grades being up $1.50 to $2 per ton. Scattered buying for electric furnace melters is reported at prices even higher than published figures.

Chicago — Weakness developed in the scrap market at mid-week which left brokers uncertain as to future trend. Mill buying since the strike has been sparse, partly because of railroad car jams, although two mills have bought some No. 1 steel, neither purchase itself being of sufficient size to establish the market.

St. Louis—Heavy breakable and charging box cast dropped $3 last week on a moderate purchase by Laclede Steel Co. Two weeks ago No. 2 melting steel went at $27. Quotations on short and random length rails are up $1. Brokers think a decline likely next week when Missouri Pacific offers 50 cars of No. 1 melting. Sheffield Steel, which usually competes for railroad scrap, is currently out of the market.

Los Angeles—Mill buying of steelmaking scrap is steady. Dealers have been able to fill post-strike requirements without difficulty. Prices are unchanged, but undertone has softened in cupola cast.

San Francisco—Mills have not entered the scrap market for new supplies and prices are steady. Scrap dealers had expected the end of the steel strike to signal increased buying and firmer prices. Mill inventories are adequate.

Seattle—Receipts of steel scrap by the mills are in excess of consumption. In order to keep shipments in line with current needs, leading buyers anticipate temporary withdrawal from the market. No intention of cutting the going price of $18 is indicated.

B-L furnace enclosures lower maintenance costs

• Unit-suspended construction provides top operating efficiency and lower maintenance costs. Here's how:

By cutting the size of the repair job. *Unit* repairs are possible; only worn tile need be replaced, adjacent areas are untouched. Result: less handling, labor, and tile replacement.

By reducing the time spent for repairs. Furnaces get back on the line—fast.

Unit-suspension avoids loading tile on top of tile and resulting cumulative stresses and strains. Mechanical spalling caused by pinching, buckling and other thermal movements is eliminated.

Specify B-L furnace enclosures for all kinds of industrial heat installations.

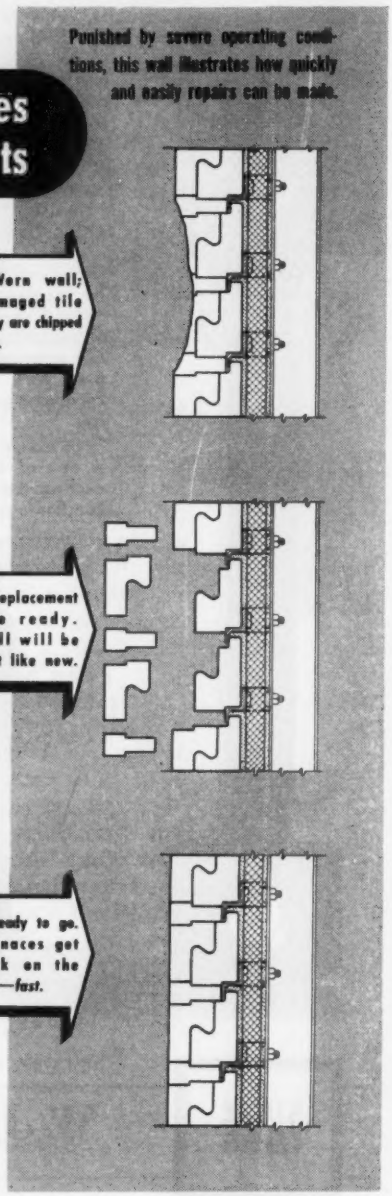
Capsule comments to complete our story:

1. Walls and arches feature "built in" stability; any portion can be removed for replacement without weakening adjacent areas. Design provides for thermal expansion.

2. Construction is air tight; heat losses are reduced. Maximum efficiency can be maintained and fuel used to full advantage.

3. Unit suspension permits flexible design, eliminates cumulative loading.

4. B-L engineers co-ordinate enclosure requirements with problems of temperatures, types of firing equipment, and slagging and erosion possibilities.


Punished by severe operating conditions, this wall illustrates how quickly and easily repairs can be made.
Worn wall; damaged tile only are chipped out.
Replacement tile ready. Wall will be just like new.
Ready to go. Furnaces get back on the line—fast.

PIONEERS OF SUSPENDED CONSTRUCTION FOR INDUSTRIAL FURNACE ENCLOSURES . . .

BIGELOW LIPTAK Corporation

BIGELOW-LIPTAK
Unit-Suspended Walls + Arches

SUBSIDIARY OF A. P. GREEN FIRE BRICK CO.
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IN CANADA
BIGELOW-LIPTAK OF CANADA, LTD., TORONTO, ONTARIO

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Warehouse . . .

Warehouse Prices, Page 107

Pittsburgh—Unusually prompt resumption of finishing mill operations has put some distributors "back in business," on such items as wide flange beams, cold-rolled and galvanized sheets, much sooner than anticipated. Demand for standard structural items and plates has been relatively light since the strike's end. Most distributors have reduced top-heavy stocks of stainless, cold-finished bars and alloy merchant bars in addition to odd-size slow-moving items in other product classifications.

Philadelphia—While business is off this month, jobbers say that if it gets no worse than at present they still will be having a comfortable operation. Orders are fairly good and in some lines, especially in light flat products, business is limited only by lack of stocks. Distributors believe that they will be unable to bring sheet inventories into balance before late in the first quarter at the earliest.

Cleveland — District warehouses continue to book new business in substantial volume, but pressure is definitely off demand. With practically all mills again in production, consumers are resuming normal buying policies. Distributors are busy replenishing depleted stocks of flat-rolled products, but are not being given preferential treatment. Warehouse stocks of bars are fair, but some sellers' inventories are not too well balanced. First quarter is expected to be pretty well along before market conditions are normal.

Cincinnati—Demand for warehouse steel is strong with buyers shopping around for fast-moving items. Mill shipments are not adequate yet to cover needs of the district, particularly in plates, sheets and structurals.

Chicago — Popular sizes of sheets and bars are still unobtainable at most warehouses and with most mills adhering to rigid schedules, there seems to be little basis for encouragement that these products will be replaced soon. With warehouse stocks so badly depleted and consumers unable to get production requirements from mills, shipments have undergone a sharp decline. Immediate rush for warehouse steel has been enough in most cases that off-grade material also moved into consumption.

San Francisco—Jobbers' volume is holding up as consumers try to replenish stocks. Warehouses are ordering liberally to build up supplies of scarce items.

Seattle — Jobbing houses report business has dropped. During the steel strike, buying was comparatively heavy as consumers sought to protect themselves against a steel famine. Nails and pipe, particularly the smaller commercial sizes, are scarce; galvanized sheets are the chief bottleneck.

STRUCTURAL SHAPES . . .

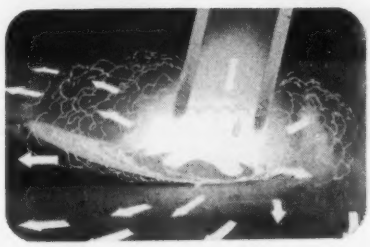
STRUCTURAL STEEL PLACED

2000 tons, office, Phoenix Insurance Co., 30 Trinity St., Hartford, Conn., through Robert Glenn, general contractor, to Harris Structural Steel Co., that city.

600 tons, rug factory, A & H Karagheusian Inc., Freehold, N. J., through Turner Con-

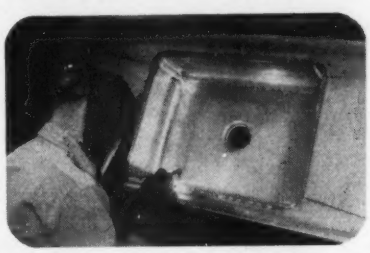
How can you cut costs with ARC WELDING?

See this film and find out!

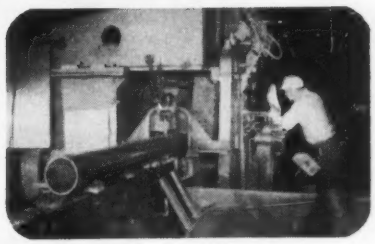


1. **"ARC WELDING AT WORK"**, a 16mm full-color motion picture produced by General Electric, has a message for every cost-conscious executive who may be overlooking opportunities for arc welding in his own plant. A vivid animated treatment (above)...

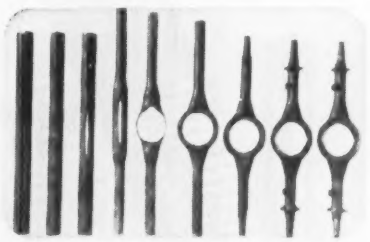
2...makes the technical parts of this film highly palatable. New uses for arc welding are suggested throughout. Welded building construction, for example (above) is shown to be efficient and economical. And as outdoor pressure vessels and piping . . .



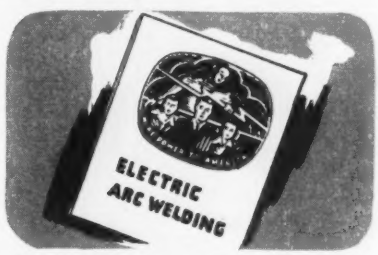
3...become larger and more complicated the value of modern arc welding becomes more and more evident. In fabricating a consumer product like kitchen sinks (above), the film shows how high-quality welding adds extra eye appeal and salability.



4. As exemplified in this tubing machine (above) automatic arc welding is shown to offer almost limitless opportunities. Here, precise heat control is the big factor. Also, arc welding provides highly ductile joints, a fabricating requirement for . . .



5...this automotive rear-axle housing (above). These welded joints withstand ten severe stretching and swaging operations, with no sign of failure! Because we believe you can profit from a wider knowledge of arc welding, let us send you this . . .



6. **ARC WELDING MANUAL . . . FREE!** It has all the data you need to make an intelligent decision on this vital subject. [The complete program consists of a 30-minute film, manual and "highlights" booklets.] MAIL THE COUPON TODAY!

FREE *to business management!*

General Electric Co., Section E684-13
Schenectady 5, N. Y.

Attach to your business letterhead

☐ Please send me a complimentary copy of the G-E Arc Welding Manual (GES-3491). (Extra copies at regular manual price—$1.25.)

☐ I'd like to borrow a 16mm print of the color film from my nearest G-E office.

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Company _____

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GENERAL ELECTRIC

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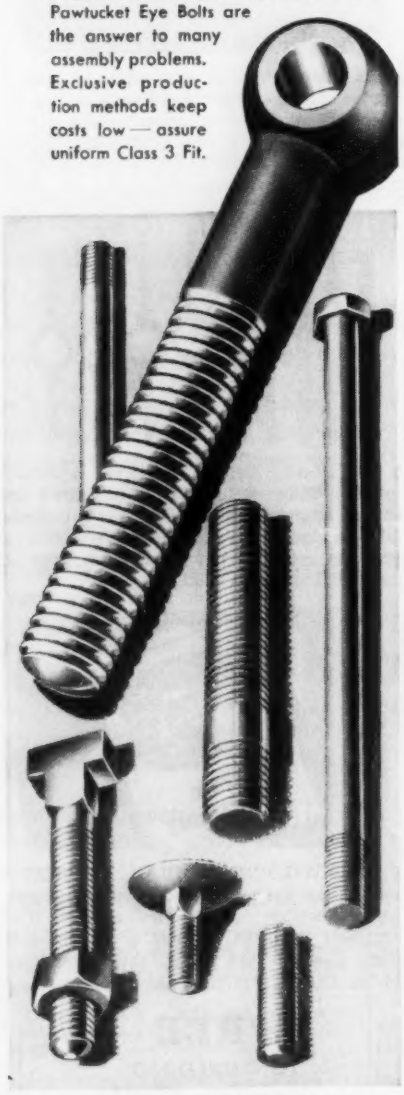
Accurately made in sizes 1/4" and larger, or to your specifications, Pawtucket Eye Bolts are the answer to many assembly problems. Exclusive production methods keep costs low — assure uniform Class 3 Fit.



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"THE BOLT MAN"

MANUFACTURING COMPANY

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THE PLACE TO SOLVE YOUR BOLT PROBLEMS

T.M. REG.

struction Co., Philadelphia, to Bethlehem Contracting Co., Bethlehem, Pa.

130 tons, St. Joseph's annex, Sacred Heart Parochial school, Bronx, New York, to Grand Iron Works Inc., that city.

STRUCTURAL STEEL PENDING

1000 tons, laboratofy, Langley Field, Virginia; bids Dec. 20.

900 tons, state bridge, Monocacy river, Maryland; bids closed.

250 tons, state bridge, Frederic county, Maryland; bids closed Nov. 22.

250 tons, power house, Central Maine Power Co., Carbou, Me.; pending.

150 tons, synthetics building, Sharp & Dohme, West Point, Pa.; bids Nov. 28. This is in addition to 735 tons recently noted as placed for construction at West Point.

Unstated, reconstruction of state capitol dome, Olympia, Wash., damaged by earthquake; General Construction Co., Seattle, low $126,750.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1100 tons, storm sewer, Omaha, Nebr., to United States Steel Supply Co., Chicago.

100 tons, grade separator, Dundee road, Cook county, Illinois, to United States Steel Supply Co., Chicago.

REINFORCING BARS PENDING

3100 tons, veterans hospital, Pittsburgh; bids asked.

470 tons, general office, Public Service Co., Plainfield, Ind.; bids asked.

402 tons, Pennsylvania turnpike, Westmoreland county; bids asked.

200 tons, state highway bridge, Hudson, Wis.; bids asked.

200 tons, Central Illinois Gas & Light Co., Peoria, Ill.; bids asked.

150 tons, nurses home, Spencer Hospital, Meadville, Pa.; bids asked.

105 tons, bridge project 373, Cuyahoga county, Ohio; bids asked.

Unstated, bear grotto, Woodland Park zoo, Seattle, $238,000 project; bids to Seattle park department, Dec. 7.

PLATES . . .

PLATES PLACED

1500 tons, Lucky Peak diversion tunnel, near Boise, Idaho, ½ and ¾ inch liner plate, to Olson Fabricating Co., Boise; general contract to Puget Sound Bridge & Dredging Co., Seattle, and Macco Corp., Paramount, Calif., general contractors, joint low bid $1,169,755.

100 tons, elevated steel water tank for U. S. Engineer, Walla Walla, Wash., to Chicago Bridge & Iron Co., Seattle, low $20,895.

PIPE . . .

STEEL PIPE PLACED

1275 tons, fabricated steel water pipe, Allentown, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

STEEL PIPE PENDING

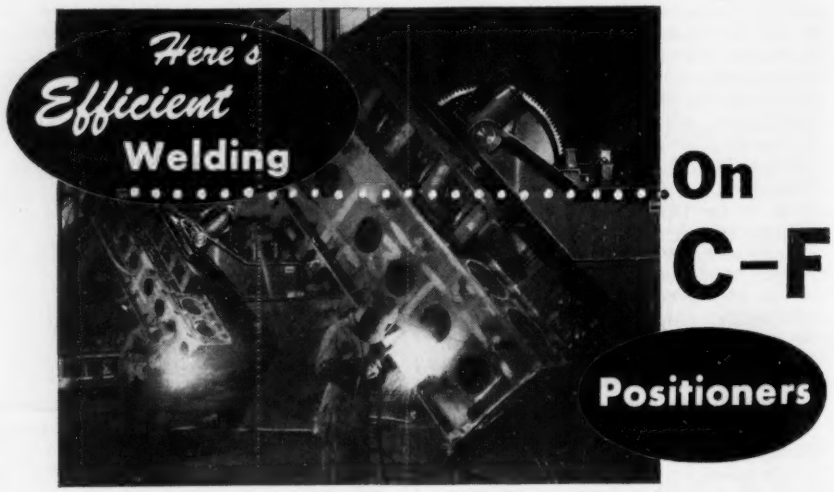
Unstated, 18,000 feet 30 and 42 inch water supply mains, Maple Leaf district, alternative concrete pipe; bids to Seattle Nov. 30.

Unstated, 5310 feet 4 inch steel pipe and fittings; bids to H. O. Hutt, secretary District No. 37, Alderwood Manor, Wash., Nov. 28; R. E. Wolfe, Seattle, engineer.

RAILS, CARS . . .

CARS PENDING

Southern Pacific, 3100 new freight cars, comprising 3000 box cars, of which 1000 will be automobile box cars and 100 gondola cars contemplated; in addition this railroad plans to rebuild 900 box cars, with the program to be carried out next year at the rate of 90 cars a month.



When heavy, unwieldy weldments like these diesel crank cases can be quickly swung into any position so that every weld is made downhand—that's efficient welding!

Weldors spend more time welding—do better welding at lower cost when they work with C-F Positioners because these hand and/or power operated machines reduce positioning time to a minimum. Investigate the cost-saving advantages of C-F Positioners. They pay their way in any company.

Write for Bulletin WP24—an illustrated circular detailing the specific advantages of C-F Positioners.

CULLEN-FRIESTEDT CO.

1308 S. Kilborn Ave., Chicago 23, Ill.

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.

C-F positioned welds mean better, more economical welds

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CONSTRUCTION AND ENTERPRISE

FLORIDA

TALLAHASSEE, FLA.—City, Robert Parker, mayor, plans electricity generating plant, at St. Marks; estimated cost, $5 million.

MICHIGAN

DETROIT — Herron-Zimmers Moulding Co., 3900 East Outer Drive, sustained damage amounting to $1 million in finished stock and equipment for manufacture of metal trim moldings for automotive applications, in a fire Nov. 20. The company will be out of production for 30-60 days.

DETROIT—Dyna-Weld Inc., 1426 Buhl Bldg., has been formed to manufacture welding electrodes; organizer Gordon C. Kennedy, 2430 Clifford Ave.

DETROIT—Ace Aluminum Inc., 2728 Buchanan Ave., has been incorporated by William G. Lawrason, 21035 St. Francis, Farmington.

DETROIT—Columbia Tool & Die Co., 8818 Traverse, has been formed by Gerard Moenart, 11487 College Ave., to manufacture special tools, gages, dies, jigs and fixtures.

DETROIT—Michigan Rivet Corp., 91 E. Milwaukee Ave., a manufacturing business, has been formed by K. M. Knuppenberg, 161 Lafayette, Romeo, Mich.

DETROIT—Rite Production Inc., 5237 12th St., has been incorporated by John F. Gatz as a machine shop and manufacturing business.

DETROIT—Klopp Engineering Inc., 5736 12th St., has been incorporated by Peter R. Klopp Sr., 858 Boston Blvd., to manufacture and sell coin-handling equipment and hand tools.

GRAND RAPIDS, MICH.—Robert B. Mackey, 1157 Iroquois Dr., has formed Do-All Castings Inc., 529 Grand Rapids National Bank Bldg. This company will fabricate metals and manufacture products.

HANCOCK, MICH.—Portage Lake Machine & Mfg. Co., foundry and machine business, has been organized by Axel A. Koski, Royce road, Ripley, Mich.

NORTHVILLE, MICH.—Rex-National Corp., 543 Dunlap, has been formed to manufacture plastics and metal products by John D. Scarbrough, 12861 Ward Ave., Wyandotte, Mich.

PORT HURON, MICH.—Worth Products Co., 4826 Lakeshore Rd., has been organized by Harvey E. Amoe, to deal in general foundry work.

FERROALLOYS

(*Continued from Page* 107)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., SMxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% **Ferrosilicon:** Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c., f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

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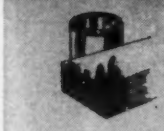
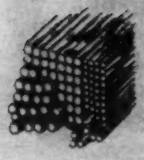

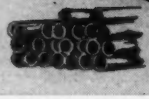

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50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.00c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l., lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.40c per lb of alloy, ton lots packed 8.80c, 200 to 1999 lb 9.15c, smaller lots 9.65c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo. each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%. Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%. Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.) Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special**

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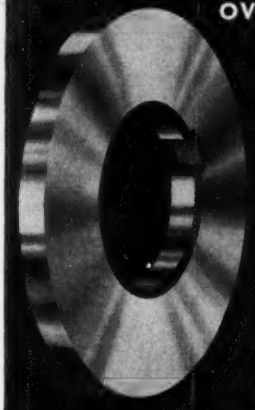

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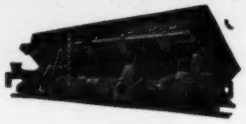

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Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $2.90 per lb of contained Cb, less ton $2.95. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8% Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed. 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); Gross tons per carload, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.10.

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